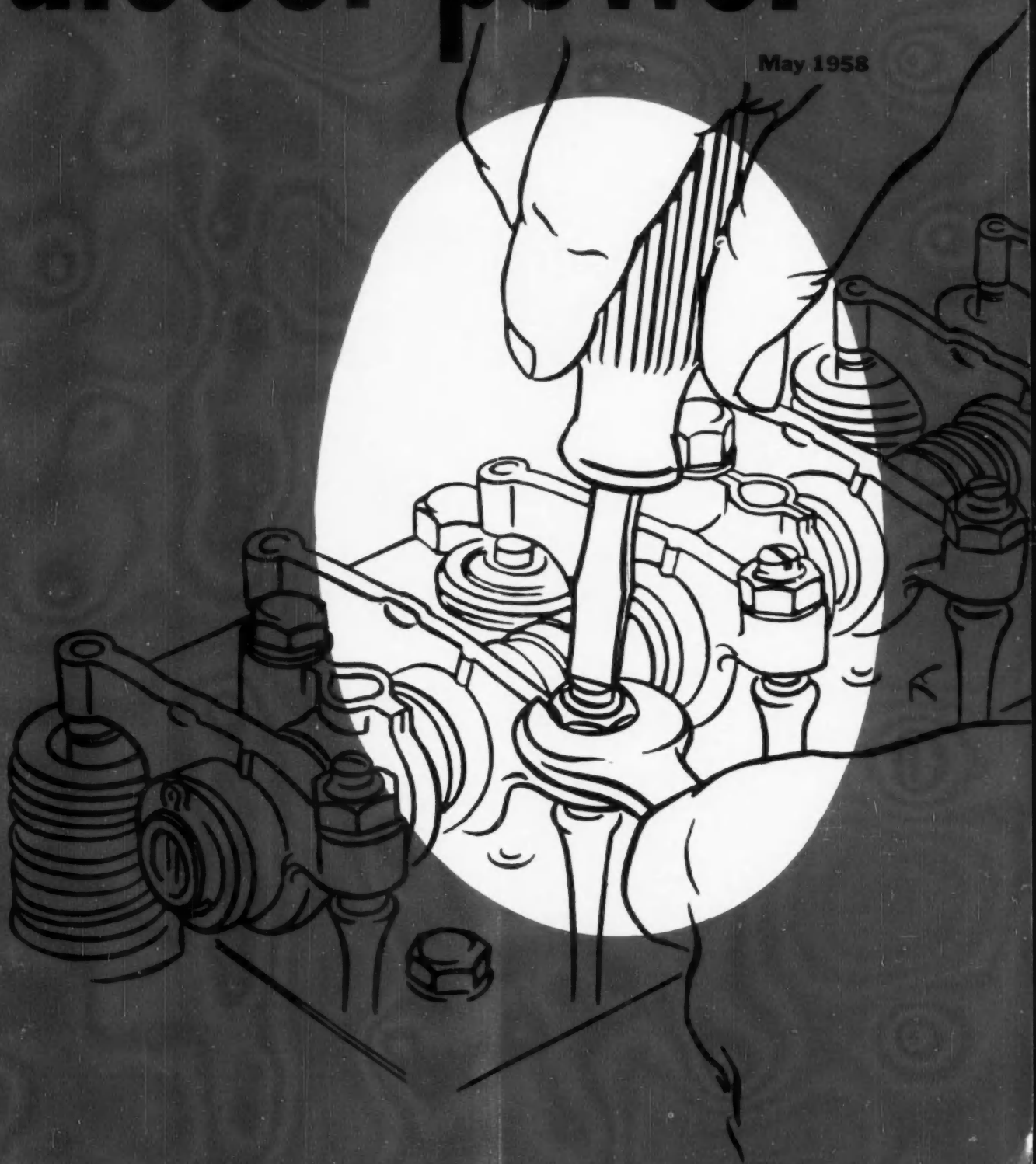
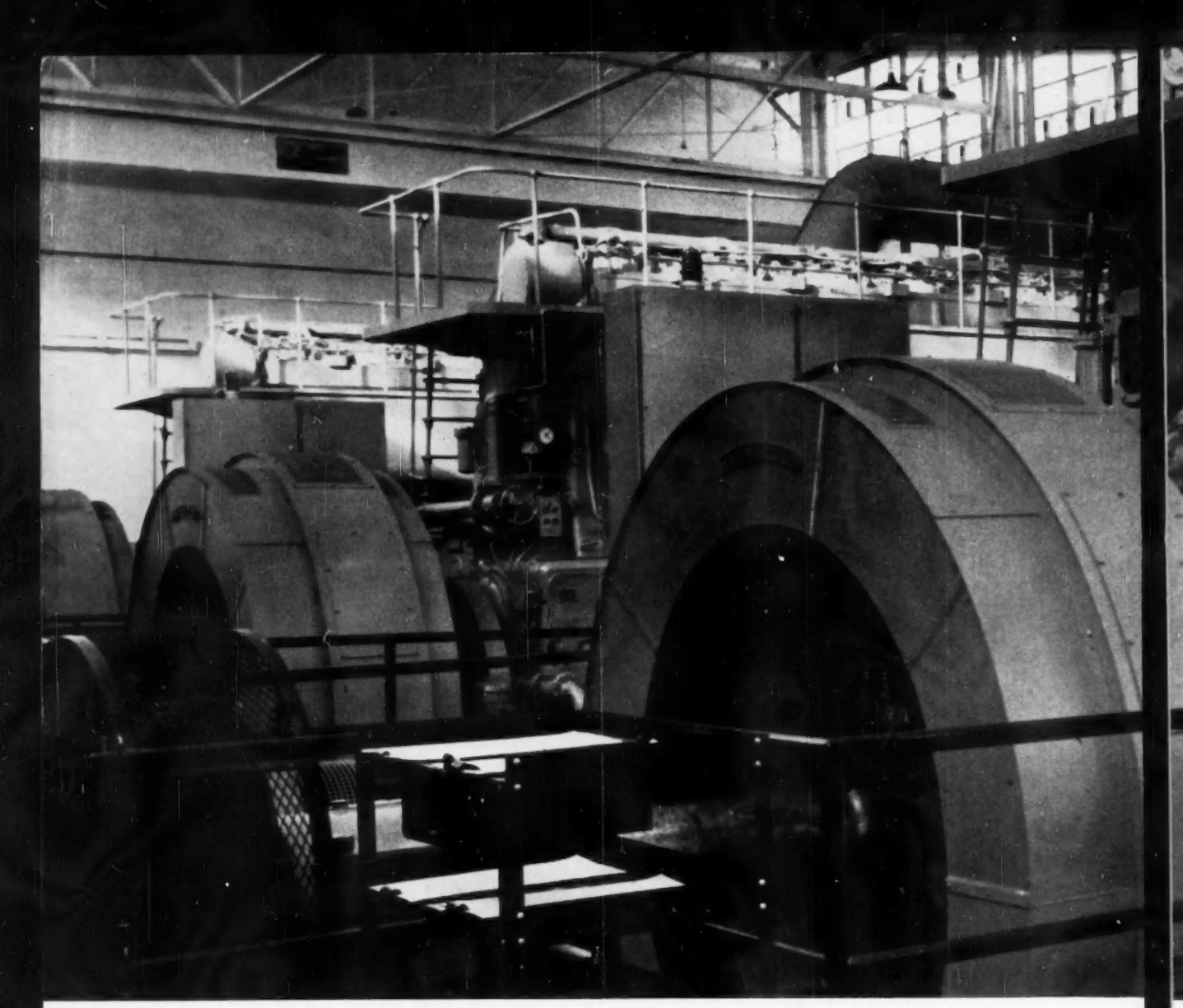
diesel power

May 1958



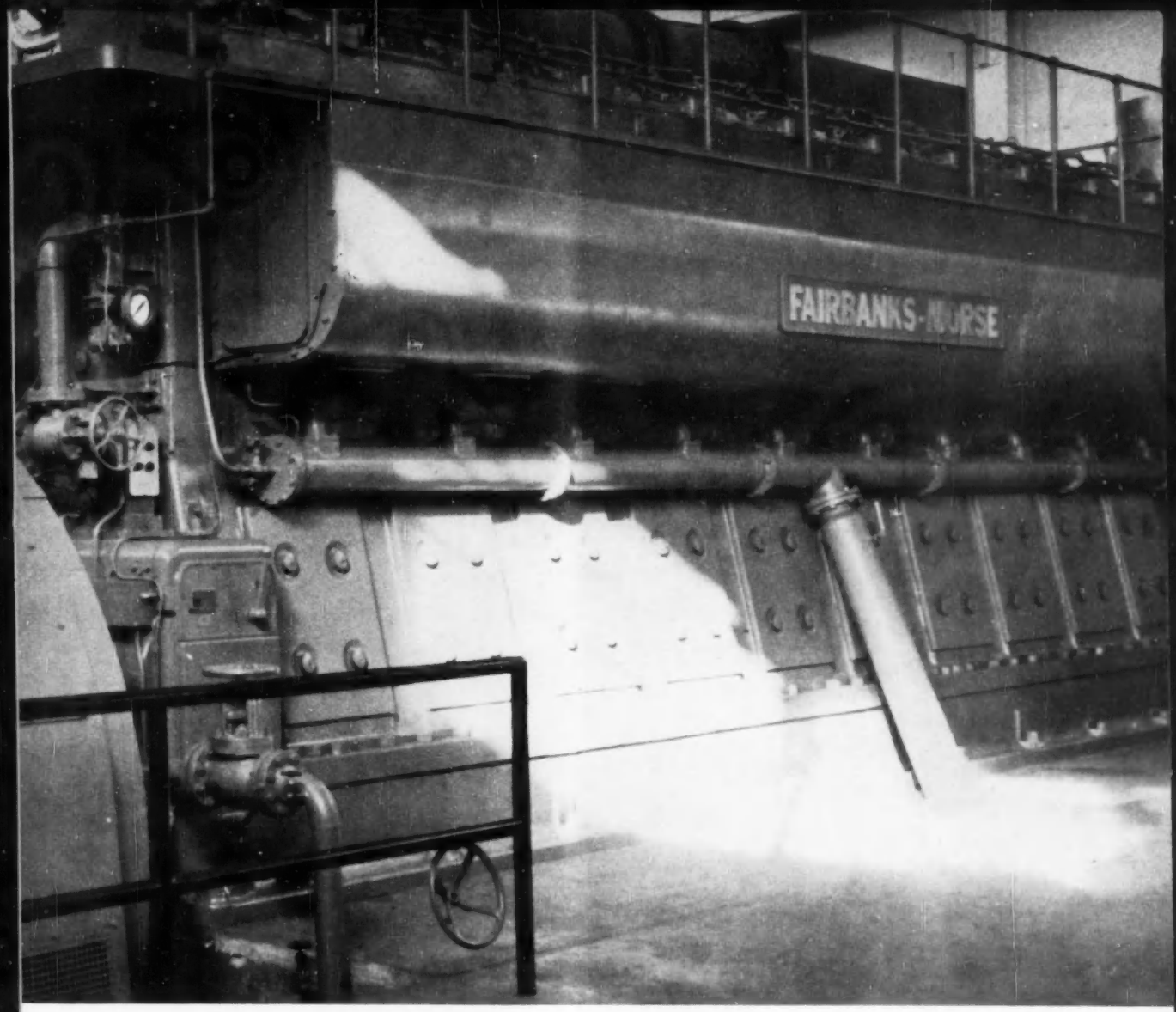


4 reasons why cost-specify TEXACO

Increasing the output of the individual engine is one way to hold the line on rising operating costs. And effective lubrication can play a major role in increasing diesel efficiency. That's why more engineers are specifying Texaco Ursa Oil Heavy Duty for optimum diesel operation. Here are the reasons:

- **Keeps engines clean.** Texaco Ursa Oil Heavy Duty is fully detergent and dispersive, resists oxidation.
- **Keeps rings free** for full compression and complete combustion.
- **Increases parts life.** Bearings, pistons, liners all last longer with Texaco Ursa Oil Heavy Duty.
- **Reduces cost** of maintenance, minimizes fuel consumption.

Carefully refined and fortified with effective additives, Texaco Ursa Oil Heavy Duty assures *more* power with less fuel over *longer* periods between overhauls. That's why, *for over twenty years, more stationary diesel horsepower in the U.S. has been lubricated with Texaco than any other brand.*



conscious engineers Ursa Oil Heavy Duty

A Texaco Lubrication Engineer will gladly give you full details on the lubrication needs of all diesel, gas and dual-fuel engines. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

☆ ☆ ☆

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

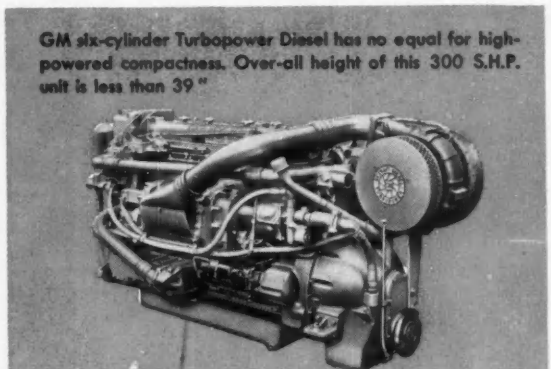
LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)

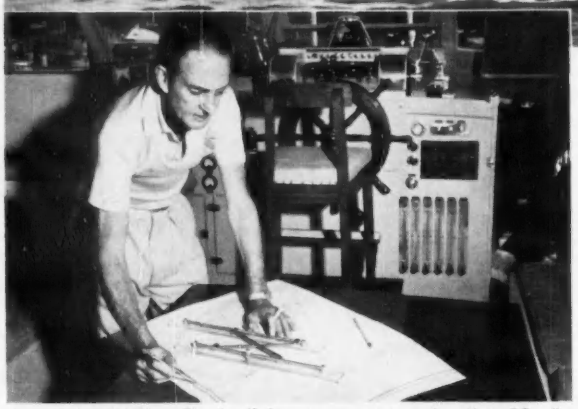
Man! What power!

"GM DIESEL TURBOS GIVE ME COMPLETE SATISFACTION"

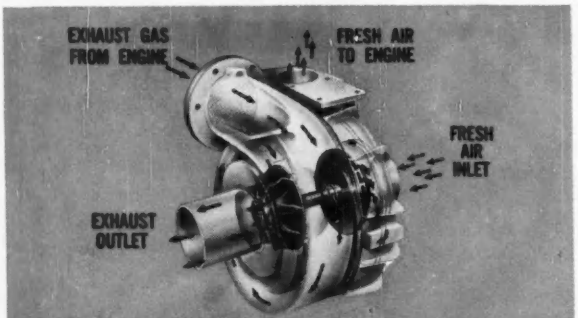
—Jay Holmes, *East Hampton, L. I., N. Y.*



GM six-cylinder Turbopower Diesel has no equal for high-powered compactness. Over-all height of this 300 S.H.P. unit is less than 39"



Jay Holmes' "Blue Shadow" boasts an automatic pilot, 20-mile range radar, radio direction finder, fathometer, radio telephone, deep freeze, hi-fi recorder and roto broiler.



Using the "free" push of expanding exhaust gases in the turbocharger makes possible increased horsepower due to more efficient performance.

Snugly stowed in her engine room, a matched pair of General Motors "6-71" *Turbopower* Diesels enables the 62-ft. Wheeler "Blue Shadow" to attain speeds up to 17 m.p.h. Owner Jay Holmes says:

"I had these engines installed when GM Diesel Turbos were introduced for marine use. They have proved their worth and give me complete satisfaction. In addition to higher power, these engines are reliable, quick starting and quiet. I know, too, I can always get good service should occasion arise."

With Turbocharging, the already highly efficient GM 2-cycle marine Diesel delivers up to 28% more power —or the same power with fuel savings up to 18%! What's more, there's no increase in weight per horsepower. With aluminum components, the 300 S.H.P. "6-71T" weighs only 2555 lbs.; the 197 S.H.P. "4-71T," only 1590 lbs. And these ratings are *true shaft horsepower*—all of it available for pleasure-craft propulsion.

It adds up to this: If you want Diesel safety—with the matchless speed and smoothness of a "Jimmy" Diesel—see your GM Diesel dealer. *You'll get top power per dollar!*

DETROIT DIESEL

Engine Division of General Motors, Detroit 28, Michigan

GM GENERAL MOTORS DETROIT DIESEL POWER

Regional Offices: New York, Atlanta, Detroit, Chicago Dallas, San Francisco

In Canada: GENERAL MOTORS DIESEL LIMITED, London, Ontario

Single Engines—30 to 864 H.P.
Multiple Units—Up to 893 H.P.

Invest pennies and save thousands of dollars!

It only takes a few minutes to change one—yet gasoline and diesel truck fleet operators are saving thousands of dollars with Purolator Micronic® Dry Type Air Filters.

Fleet records show that Purolator Dry Type Filters greatly extend the period between engine overhauls . . . they provide *positive* protection that helps prevent expensive major repairs and down-time.

Purolator Dry Type Filters provide *positive* filtration . . . every bit of air must pass through them before reaching the engine. Unlike oil bath filters, which depend on air velocity controlled by engine speed for peak performance, the dry type works at maximum efficiency regardless of engine speed. In fact, the dry type gains in efficiency as the dirt load increases.

Purolator Dry Type Air Filters cut maintenance expense, too. They have a low initial cost, can be cleaned and re-used several times, and are quickly and easily changed without any oily mess.

There's a Purolator Dry Type Air Filter for all makes of truck or industrial engines . . . to safeguard the engine against any on-the-job dirt condition. For complete information, send for your free Air Filter catalog, or call your near-by Purolator Supplier.

"Purolator" Reg. U. S. Pat. Off.

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Oil, Air & Fuel Filters

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MAIL THIS COUPON TODAY!

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Rahway, New Jersey

Yes, I want more information about dry-type filtration for fleets.

Name_____

Company Name_____

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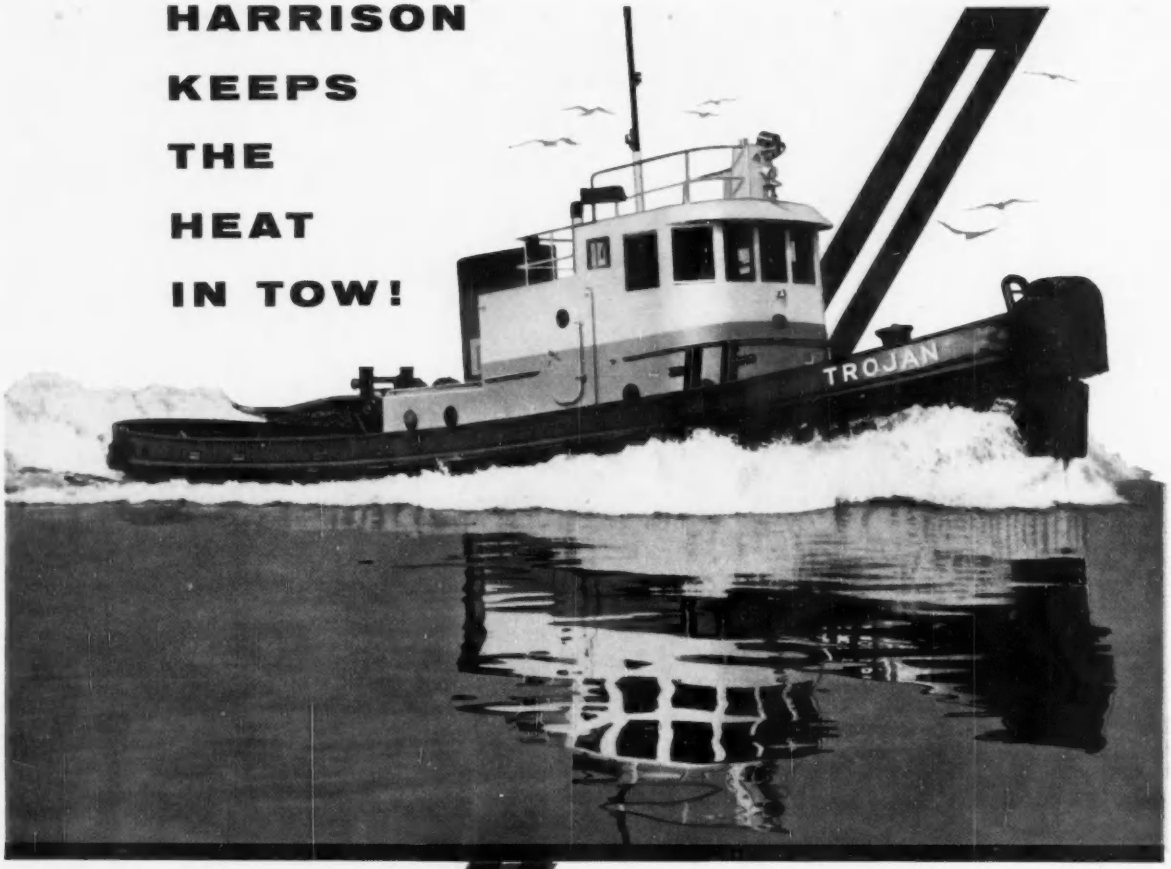
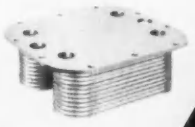
City_____ Zone____ State_____

HARRISON KEEPS THE HEAT IN TOW!



Temperatures made to order for all types of diesel engines. Harrison heat exchangers are rugged, reliable and compact . . . engineered to provide the optimum in cooling efficiency.



Harrison Heat Exchangers Help Keep This Tug on Round-The-Clock Duty for 3,456 Hours!

Harrison gives heat the slip on any ship. This tug worked a 24-hour day for months with no breakdown—with Harrison heavy-duty heat exchangers on the job. Harrison heat-control equipment provides cool performance on many of today's top marine diesels . . . assures top efficiency, endurance and economy even under heavy loads. That's because Harrison is backed with over 47 years' research and manufacturing experience which assures you of complete dependability in a top-quality product. If you have a cooling problem, look to Harrison for the answer.

TEMPERATURES MADE TO ORDER

HARRISON

GM

FORWARD FROM FIFTY

HARRISON RADIATOR DIVISION • GENERAL MOTORS CORPORATION • LOCKPORT, N.Y.

editors notes...

You'll want to read about...

A New Orleans shop with ideas (Pg. 14), specializing in sales and service of fuel injection equipment and governors. One of the first members of the Association of Diesel Specialists, Gerhardt's is considered outstanding in many respects by fellow members . . . .

Why and how locomotive engine air should be filtered (Pg. 18) not once but twice. Results show that carbody filters should be backed up with efficient secondary filters for proper engine air cleaning . . . .

The Cummins approach to overfueling problems during turbocharged operation (Pg. 20). For example, if smoke during acceleration is one of your problems, this simple automatic device in the fuel injection system is for you . . . .

Introduction of diesel-powered cabs into U.S. fleet operation (Pg. 22). Three Mercedes-Benz 180-D cabs are getting a tryout in South Bend, Ind. Present results indicate over $1000 savings per unit per year . . . .

An operating record showing what can be done with effective PM, including use of good products (Pg. 24). And this is in tough bus operation. Use the result as a yardstick against your operation and then get busy . . . .

You'll want to read about...

Details of a diesel outboard engine (Pg. 26), proof that diesels can be developed to compete in size and weight for the small-engine mass-market . . . .

How parts inventory control by business machines (Pg. 28) insures that the right part will be available, not only for current production models, but for all models still operating in the field. You'll appreciate these modern methods when you need a part for a 10-yr old engine—and get it . . . .

A new concept in automotive generator systems (Pg. 30). A compact and rugged a-c generator-rectifier-regulator package has only one moving part—the rotor. If you need high output with reliability and low maintenance costs, here's an answer for you . . . .

The number of inquiries coming in by use of the Reader Service card and by letter shows that our Departments can be valuable to our readers. Are you using them to best advantage? You should, because we comb the industry for items potentially valuable to you.

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BPA

diesel power

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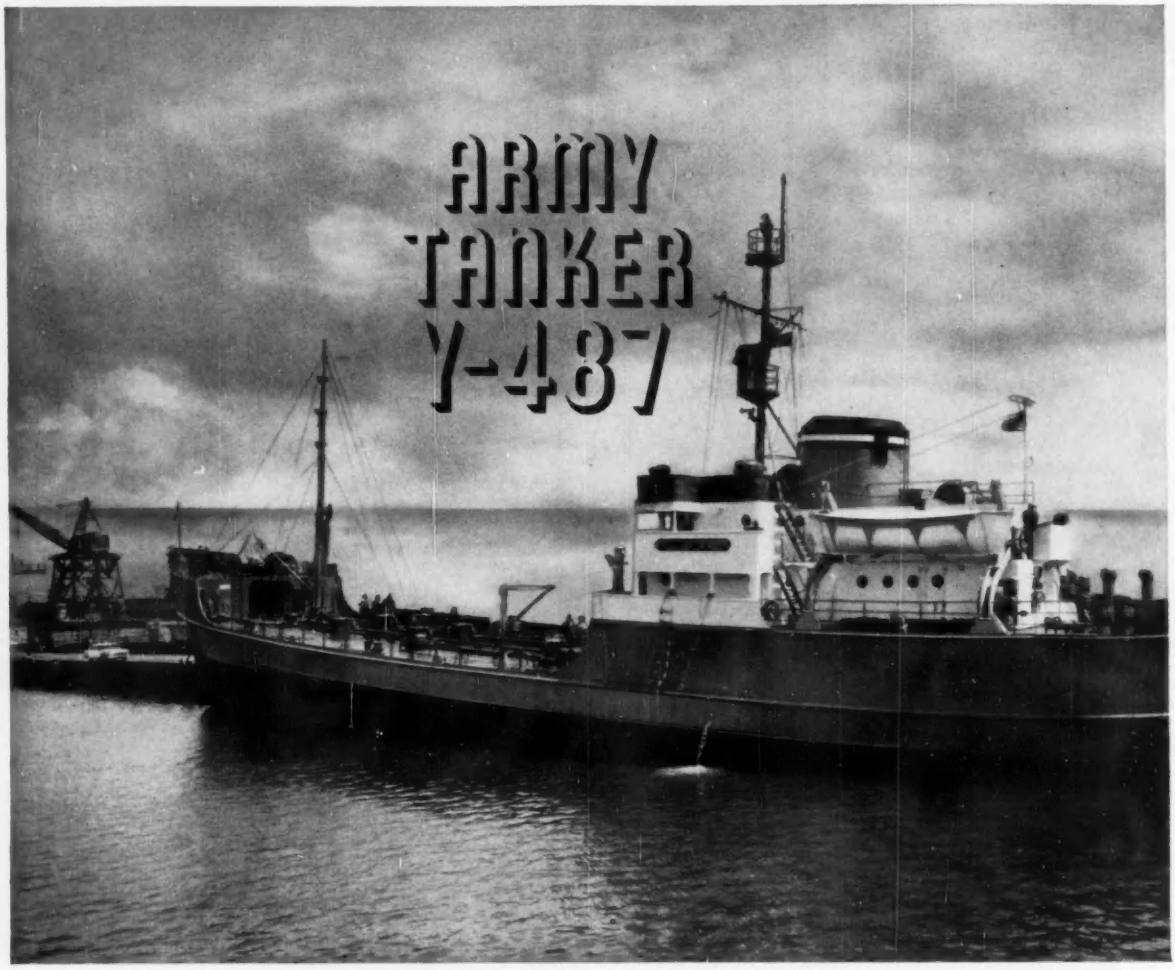

RELIES ON BENDIX FUEL INJECTION EQUIPMENT TO MAINTAIN SUPPLY LINES IN JAPAN

During times of peace as well as in times of conflict, lines of supply must be maintained as dependably and as economically as possible. Bendix* Fuel Injection equipment is helping the Y-487 and the Army Transportation Corps to transport bulk petroleum products efficiently and economically for the U. S. Army in Japan.

Powered by two Cooper-Bessemer FVA diesel engines with Bendix Fuel Injection equipment, the rugged Y-487 made its maiden voyage from Brooklyn, N. Y. to Yokohama. And on the 4200-mile leg of its journey from Hawaii to Japan, the tanker averaged 11½ knots and arrived fourteen hours ahead of schedule.

There is good reason why Bendix Fuel Injection equipment should have been selected for this important work. Whenever dependable, efficient and economical fuel operation is a requisite, the logical choice for injection equipment is Bendix. With marine diesel engines as well as diesel engines for all types of industry, Bendix Fuel Injection equipment meets the highest standards for exceptional performance. *REG. U.S. PAT. OFF.

SCINTILLA DIVISION OF BENDIX AVIATION CORPORATION, SIDNEY, N.Y.
Export Sales and Service: Bendix International Division, 205 East 42nd St., New York 17, N.Y.

Scintilla Division
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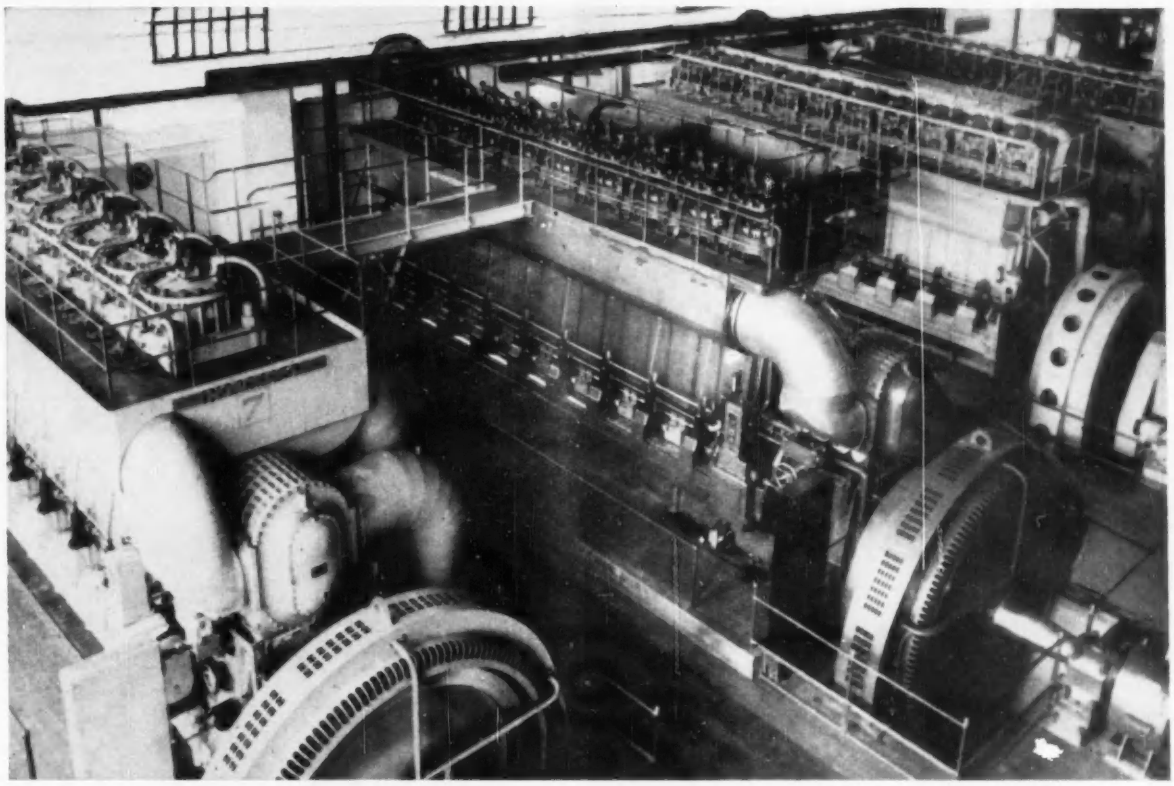
Bendix
AVIATION CORPORATION

Look to **COOK** for Better Rings!



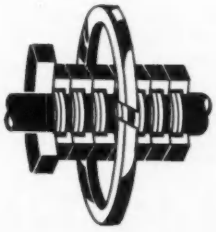
After 25,037 operating hours... Cook rings good for 10,000 more!

HERE'S the result of a cylinder inspection by Rockville Centre, N. Y., municipal power plant officials. It's a report on their No. 8 Diesel unit after almost three years of continuous operation.

"While several rings were replaced in Grooves 1 and 2, Cook rings in Grooves 3, 4, 5 and 6 could run for another 10,000 hours! And cylinders averaged less than .001" maximum wear per 1000 hours of operation."

Light-tight Cook Piston Rings prevent scuffing and blow-by . . . conform perfectly to the cylinder wall because they are re-turned as a final manufacturing process. In addition, Cook rings are tensioned by an exclusive, gentle "squeezing" process that guarantees constant, uniform tension — *for life!*

For complete information on Cook Piston Rings and name of nearest representative, write: C. Lee Cook Company, 946 South 8th Street, Louisville 3, Kentucky.



C. LEE COOK COMPANY

A Division of Dover Corporation

Rings and Packings Since 1888

Boost giant crawlers over rugged terrain at high altitudes

Uniform sea level performance in the thin air of Colorado's high country is standard operating procedure for International Harvester's big TD-24 crawlers, now that the AiResearch Turbocharger T-14 has been added.

Actual on-the-job results at high altitudes under widely varying operating conditions have shown:

- increased horsepower to sea-level rating
- lower fuel consumption per horsepower
- improved lugging
- less smoking and cleaner running engine
- reduced maintenance costs

All AiResearch turbochargers are air-cooled, thereby requiring no extra plumbing, and placing no added burden on the cooling system. Ease of installation and long life add to the outstanding record of AiResearch turbochargers in the field.

Your inquiries are invited.

THE GARRETT CORPORATION

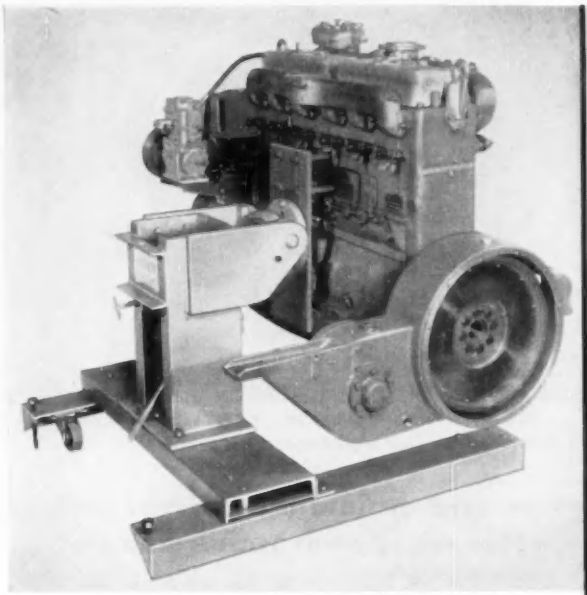
AiResearch Industrial Division

9225 South Aviation Blvd., Los Angeles 45, California

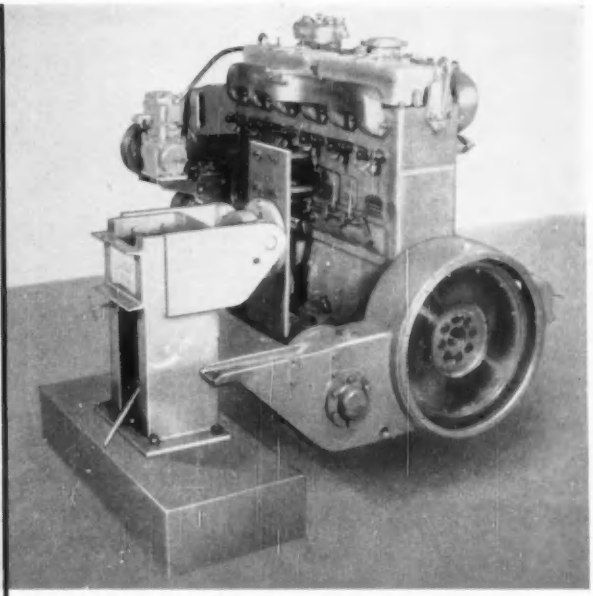
DESIGNERS AND MANUFACTURERS OF TURBOCHARGERS AND SPECIALIZED INDUSTRIAL PRODUCTS

FIELD TESTED AND APPROVED:

New Kent-Moore Universal Diesel Engine Stand



J6837 MOBILE STAND has two fixed and two swivel casters for mobility. Floor locks hold stand in place. Like permanent Universal Engine Stand, it's engine manufacturer approved.



J7329 STATIONARY STAND has floor-mounting base for permanent installation. Both models are only 32" high at mounting flange, 35" high with pump fully extended and engine in horizontal position.

Handles all popular makes • hydraulically powered • eliminates hand cranking

The most versatile engine stand ever designed for automotive-type Diesel and gasoline engines, the Kent-Moore Universal Engine Stand handles with ease the largest popular makes and models that can be side-mounted. Hydraulically powered for quick, easy positioning, the Universal Engine Stand eliminates all hand cranking.

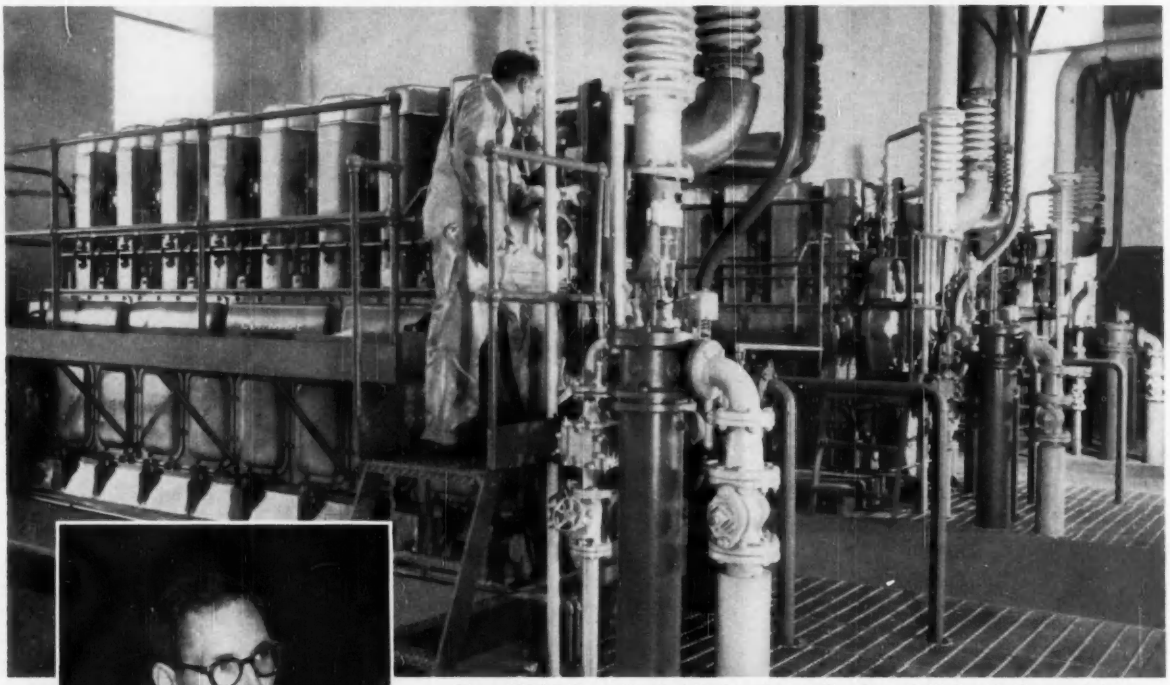
Full-range adjustment relieves fatigue, permits repair or removal of any component from top, bottom or side of the engine at comfortable, work-bench level. Swivel plate swings freely on tapered roller bearings through full 360° circle, locks securely in any desired position.

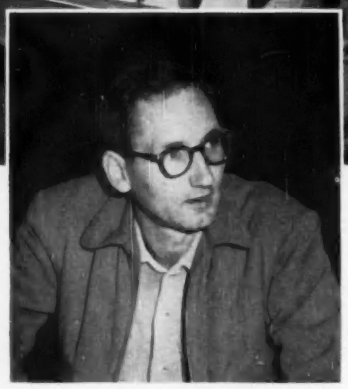
Available in either portable or permanent installation model, the Universal Engine Stand is engineered for rugged, day-after-day duty. A wide range of adaptor plates permits servicing of nearly 50 different models of Allis Chalmers, Caterpillar, Cummins, Detroit Diesel, IHC, Mack and White Diesel engines.

58-D2

KENT-MOORE ORGANIZATION, INC.
28635 MOUND ROAD, WARREN, MICHIGAN
ENGINEERS AND MANUFACTURERS OF SERVICE TOOLS AND EQUIPMENT

Enterprise Engines Run 90% on Free Sewage Gas





Three 625 HP Enterprise Dual Fuel engines at San Jose, Calif. handle the complete power load for all electrical and pumping requirements of this sewage plant.

"Trouble-free and maintenance-free, with very reasonable manpower requirements."

Fred M. Belick

Supt., San Jose, Calif., Sewage Treatment Plant

"We're extremely pleased with the record of efficiency and economy experienced to date with our three Enterprise Engines. They have operated trouble-free and maintenance-free, fitting in exceptionally well with our treatment plant requirements.

"By operating on methane, the sludge gas by-product of sewage treatment, our fuel costs have remained at a minimum. In addition, the Enterprise Dual Fuel 'Select-O-Matic'® feature has given us the flexibility we need when sludge gas production becomes erratic. On either gas or oil the engines respond well to changes in power demands. All in all, these engines provide us the dependable, continuous operation we need with very reasonable manpower requirements."

This and other model sewage plants in such cities as New York, East Boston, Mass., and San Diego, Calif., attest to the fact that complete dependability and economy of municipal operations start with Enterprise Engines.

Engines of Every Type and Size for Every Municipal Need

Enterprise specializes in engines for stationary and portable electric power generation, flood and water pumping systems, and sewage plant power. Versatile fueling is available in diesel, dual fuel and spark ignited gas engines. Models range from 73 to 7703 HP. Call in the Enterprise sales engineer in your area, or contact factory direct for information or help with your plans.

ENTERPRISE
dependable **ENGINES**

Over a million horsepower at work the world over!

ENTERPRISE ENGINE & MACHINERY CO.
Subsidiary of General Metals Corporation
18th and Florida Streets, San Francisco 10, California
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Boston • Chicago • Des Moines • Fort Worth • Huntington • Jacksonville • Kansas City • Los Angeles
New Orleans • New York • Pittsburgh • San Diego • Seattle • St. Louis • Washington, D.C

Editorially speaking -

PM—Your Best Investment

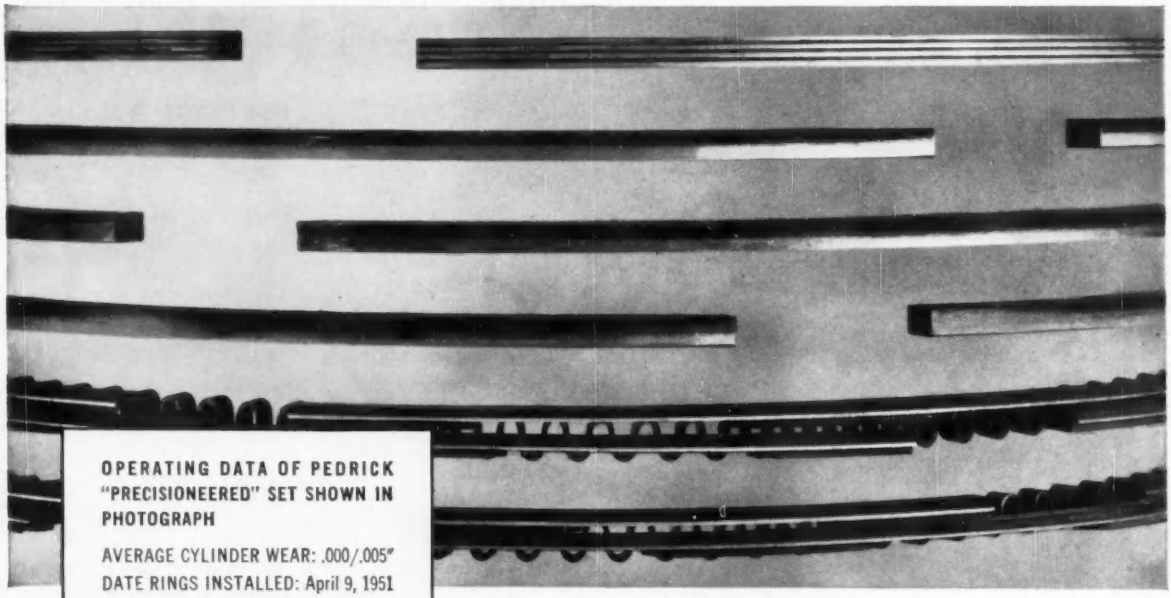
You shine your shoes, don't you? And paint your house? Do you get out and shine up the car? Sure, you do. Okay, why? Simple—to protect an investment. And you invest time, effort and money to do it. If you'll do this to protect personal property, why not with business investments, say, your diesel equipment? It may well represent a greater investment than even your house and has the added importance of providing you income. Doesn't it make sense to invest in a preventive maintenance program to protect this large investment? You'll agree, of course, and assure us that you are doing just that. Don't feel too smug about it. The tag "Preventive Maintenance" can be tied to giving your engines a lick and a promise or to an adequate system. Is your system any good? Does it have proper supervision, depth in detail and is it based on sound decisions? On this basis, let's look at our opening questions. Polishing will help preserve shoes but to protect their shape, you need shoe trees. About painting your house, did you get the best paint or fall for a "bargain"? Was surface preparation adequate? Was it applied in damp or too-cold weather? All these things can affect the life of the job. With the car, the outside will look nice but when did you clean the air filter last? Or change the oil filter? Both can be more important than the paint job in the long run. So there is more to PM than just doing the *obvious* things. And today there's more incentive to do *all* the right things, at proper intervals, using best quality materials. With business tighter, you can shave some expenses but to cut on preventive maintenance is foolhardy; you'd do well to intensify it. Yet an official of one of the best filter companies reports, "We find . . . operators are all cutting back in purchases and are apparently attempting to run equipment much nearer to breakdown than ever before. A breakdown is much more expensive than good, continued preventive maintenance." Yes, it's happening; we see many examples. You may fool yourself but you can't fool the engine. It knows what it needs to keep running efficiently. So time, effort and money expended for a good PM system to protect your major investment is good business—good for your equipment, good for you and, especially today, good for business in general.

BPE

40,622 hours of operation

. . . an average of 6,350 h.p. hrs. per gal. total lube oil consumption.

The photograph shows Pedrick Piston Rings removed from a Cooper-Bessemer GMVTF 10 cylinder engine after 40,622 hours of operation. Note carefully how the face-wear on the rings (the bright area) extends only half way up. After more than six years of *full load* service, these Pedrick rings are practically as good as new.



OPERATING DATA OF PEDRICK "PRECISIONEERED" SET SHOWN IN PHOTOGRAPH

AVERAGE CYLINDER WEAR: .000/.005"
DATE RINGS INSTALLED: April 9, 1951
DATE RINGS REMOVED: June 27, 1957
TYPE LUBE OIL: DTE No. 3 MAGNOLIA
RATED HORSEPOWER: 1100
MAXIMUM OVERLOAD: 10%
LUBE OIL CONSUMPTION: CRANKCASE—39,600 H.P. Hours per Gal. LUBRICATORS—(14 qts. per day) 7,530 H.P. Hours per Gal.
TOTAL LUBE OIL CONSUMPTION (CRANKCASE AND LUBRICATORS): 6,350 H.P. Hours per Gal.

For longer life at full power, make Pedrick "Precisioneered" Piston Ring Sets your *standard* replacement sets. You'll find your Pedrick engineer will be glad to call and help you solve any special problems. Write, wire or phone:
WILKENING MANUFACTURING CO., Phila. 42, Pa.
In Canada: Toronto 2.

Pedrick PISTON RINGS

PEDRICK PIONEERED CONFORMABLE PISTON RINGS FOR BIG-BORE ENGINES

highlights

Railroads were the biggest users of diesel fuels in 1956. They consumed more than 46% of 180 million barrels of fuel sold in the United States in that year.

Thermal efficiency of 88% is claimed for the operation in a Belfast, Ireland, flax spinning mill. Using an 18,350-Btu residual oil, a Mirrlees diesel with waste heat recovery equipment generates power and provides steam and hot water for processing, space heating, etc. Only loss is to auxiliaries, radiation and exhaust, totaling 12%.

Alco's diesel locomotive export sales in 1957 was reportedly 80% of all U. S. higher-horsepower overseas business. In line with this great overseas activity, Alco Products, Inc. has assigned Stanley E. Lodge, their director of training programs to make a series of trips abroad. He will help expand diesel-locomotive manufacturing operations of Alco licensees abroad. He will also help set up training programs for operating, servicing and repairing diesel locomotives.

The petroleum industry will have to invest some $115 billion to meet oil demands between now and 1967. A free-world petroleum demand of 24,800,000 barrels a day by 1967 is expected by Socony Mobil economists. This is an increase of 8,900,000 barrels a day over 1957. This will take a lot of well drilling, pumping and transportational equipment. Demand increased from 7,800,000 barrels a day to 15,900,000 barrels a day from 1947 to 1957.

Mack Trucks, Inc., sales in March were 48% higher than in first two months of this year. Sales for the second quarter are expected to be better than the first according to P. O. Peterson, president of Mack. He cited that general economic conditions were chief reason for slow start but bad weather early in year and the delay in the federal highway program were contributing factors. The company is confident that their upward trend in business will resume because the factors which caused the rapid growth in truck transportation are more potent today than ever before.

Diesel-powered truck use in America jumped 41% in last two years alone. Mack Trucks, Inc. has led the industry in diesel truck sales for fifth consecutive year. Last year they supplied over 45% of all diesel-powered trucks sold in America, according to the Automobile Manufacturers Assoc. This was 20% higher than in 1956.

One hundred seventy diesel-electric locomotives were put in service in the first two months of 1958 by Class I railroads according to the Association of American Railroads. New locomotive diesel-electric units on order as of March 1, 1958, totaled 243. Thirty gas turbine-electric units were also on order as of March 1.

C-B reverses normal role of engines in their JX Expander. This reciprocating expansion engine for gases generates super-cold temperatures. Gases at up to 3000 psi can be expanded to temperatures as low as —300°F. Useful work produced by expansion makes cycle more efficient than simple expansion through a throttling valve. It will be useful in the cryogenic fields, for example, production of liquid oxygen, nitrogen, etc.

Reserves of natural gas rose to a new peak while reserves of liquid hydrocarbons in the U. S. declined in 1957. Crude oil reserves were down 134-million barrels; natural gas liquids down 214-million barrels, from 1956 peak. Natural gas reserves increased 8-trillion 794-billion cu ft. Crude oil increased about 7-million barrels; natural gas liquids were up 6-million barrels. Natural gas was up 594-billion cu ft over 1956.

Caterpillar Tractor Co. has received the Navy's highest award to civilian organizations. The Certificate of Merit was awarded for outstanding service to the Navy Dept. in development, manufacture and production of specialized diesel tractors. The tractors were for "Operation Deep Freeze I", an exploration and construction mission in the Antarctic. The design, testing and production of these units had to be completed within 5½ months. A delay of even a few weeks would have meant loss of a whole operating year.

Talking Shops

Continuing this series of articles, DIESEL POWER visits Gerhardt's, Inc. in New Orleans, specialists in sales and service of fuel injection equipment and governors. Others in the same business consider this an outstanding shop from the viewpoints of physical layout, tooling and quality of work. We agree, and equally important for our purpose in presenting this interview, it is packed with good ideas that reflect the ingenuity of the personnel.

Several soak tanks provide cleaning flexibility. Choice of compounds and cycle time can be selected to suit types of materials and deposits to be removed. Ed Stack is handling the basket used for holding small parts.

SHOPS are as different as people. Even when doing the same line of work and sticking to factory specifications and methods there is room for individuality. Probably this is because people — and their ideas — run the shops and make them something more than a lot of expensive tools.

Ideas make the difference and the objective here is to dig out as many as possible and pass them on for your consideration. Manuel Gerhardt, the owner, was interviewed and he supplied a great deal of information. Part of it is conveyed in the pictures. They show the extent of tooling, the convenience of arrangement and general shop cleanliness. The text concentrates on some of the more important ideas expressed. Here's how the interview went.

"Manny, I want to concentrate on ideas — the things that make your shop different from others. First, I understand that you have a unique personnel setup."

"Well yes, one phase in particular. Your people are your most important asset. You've got to have them working *with* you, not *for* you. There are 12 of us here including the two girls in the office and myself. I can walk out of the shop for weeks if necessary and know that things will go on just as if I were here.

"For such an operation, people have to be satisfied in their jobs. We've worked together to achieve this. The unusual feature in a shop of this size is that we set up our own company union. They get all the benefits, and more, that many other employees have to fight for. No one has to worry about their 'rights'; they all have a say in what goes on.

"But you're here to talk about the shop."

"It's something to think about all right. Now let's get to the shop."

"Okay, we'll start with cleaning. We strip every unit that comes in right down to the metal. Degreasing is the first step. Finely-finished parts go into the soak tank for varnish, lacquer and carbon removal. Castings and rough parts are sandblasted.

"Say, while you're passing on ideas, pass one on to the builders of cleaning tanks. Good cleaning compounds cost money. We know that we can stretch their life by filtering. Yet with every tank we buy, we have to rig up a filter system. Why don't they build them in?

"I'll pass the word but let's talk more about sandblasting."

"We used to clean parts on a wire brush but the boys' hands lost a lot of 'meat' and we wanted a better job. We tried sandblasting and wound up with two machines. They do a better job in less time.

"A small amount at a time of flint abrasive is used in the big machine. As soon as it is contaminated with paint and carbon, it is dumped and only a little abrasive is lost. This way, cleaning efficiency is kept high and costs kept down. We use a much finer compound in the smaller unit. It is convenient and fast for removing deposits on parts that can tolerate moderate sandblasting."

"How important is all this external cleaning?"

"It depends on how you look at it. We feel that a unit rebuilt to work like new should look like new. Units are spray painted (often with the manufacturer's paint) and get new nameplates. Then we seal all openings with plastic closures and you can't tell the rebuilds from new equipment.

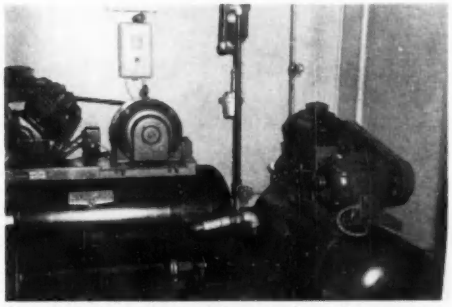
"Some shop operators report that customers in their areas won't pay the little extra for this work. As long as units work, appearance doesn't count. But it impresses our customers and they'll pay for it. Where you can do it, it's good merchandising and besides, it gives our boys more pride in their work."

"What's the story on these siamesed air compressors?"

"At times we use a lot of air for sandblasting, running the governor test stands and general shop use. When we needed more capacity, it worked out better financially to buy a second unit rather than trade the one we had for one big one. Then we had a brainstorm when hooking them up and are glad that it worked out that way.

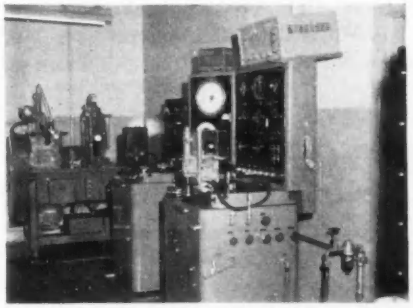
"The 15-hp unit carries the baseload and the 5-hp compressor, the peaks. A big pipe equalizes tank pressures. Controls were set so that the big unit cuts in at 105 psi and cuts out at 145 psi. The small one cuts in at

Two sand blast machines and edge of spray-painting booth are at left. Earl Jacobs is cleaning pump housing in big unit. At right this pump housing is seen compared to a housing before cleaning.

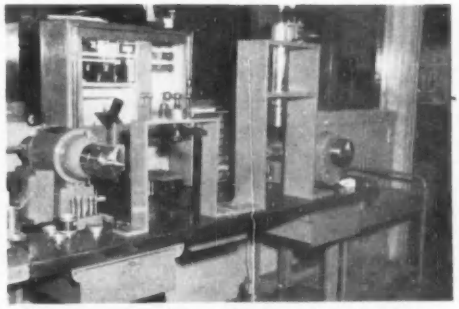


Storage tank pressures of large and small compressors are equalized by a pipe connection. Pressure switch range of small unit is higher than that for larger one. Thus for moderate air use, only small unit operates.

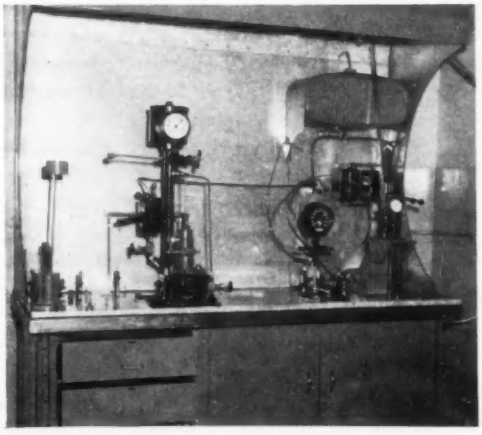
Two calibration stands, back to back, provide four work positions for most convenient pump mounting. Plus increasing calibration work capacity, two machines cut setup time as fixtures and adaptors for frequently-handled pump types can be left in place.



Two governor test stands and APF-type pump calibration stand (background). "EPUT" meter at top of first stand gives accurate rpm indication and pressure gauge (large white dial) precise pressure for calibrating governors with solenoid-controlled speed settings. Note the quick-disconnect couplings on the lines to the governor on test.



Two nozzle test fixtures that permit quick testing of nozzles without need for assembling nozzle to holder. Fixtures were placed on nozzle reconditioning bench only for purposes of picture.



Nozzle test equipment includes run-in stands. Complete checks for leakage, popping pressure, needle lift and spray pattern are made. A dial indicator device was made to check needle lift.

Heavy vise set deeply in concrete holds large pumps and nozzles firmly when high torques are applied. Handy cart is one of many used in the shop for transportation purposes.

Henry Brewer checks inventory cards in parts dept. They reflect stock on hand, location, usage and ordering date.

Last step is protection and packaging. Al White has sealed openings with plastic closures and tagged pump.

130 psi and tops off at 160 psi. Unless we are using a lot of air, the 5-hp unit holds the pressure. It works out much better than starting up one big 20-hp unit each time the pressure drops a little.

"Now let's look at the governor and pump calibration room."

"You can see our major tooling: Two double-drive calibration stands, back-to-back, for APE-type and distributor pumps; a stand for APF-type pumps; and two governor stands. That monster is an aircraft governor test stand. We plan to get into this work.

"I'll point out some of the things that we have done to improve test procedures or to speed them up. Let's start with the big governor test stand. We found need for greater accuracy of speed and pressure indication than originally provided when testing governors with solenoid speed setting. That box at the top is an "EPUT" meter. It is far more accurate than the tachometer supplied and gives continuous rpm data. The big indicator in the attached cabinet at the left, gives accurate pressure readings in fractions of pounds.

"Another item added is a rotary converter to give us high-amperage d-c voltage for operating the governor solenoids.

"One other feature, and you'll see it on a lot of the machines, is use of quick-disconnect, sealing-type couplings on the oil lines. Their push-pull action saves a lot of time compared with threaded connections."

"What about innovations on the pump calibrating stands?"

"Most are in the nature of adapters and fixtures to mount different types of equipment or to do a job better or faster. Most shops build them as they go along. Here's one wrinkle for you. Some of the new injection pumps are coming through with solenoid shutoffs. We rigged up a simple battery trickle charger to supply power for testing these while the pump was on the stand."

"Okay, how about your nozzle room?"

"While we're walking through, notice this vise. That pedestal is set in concrete deep in the ground. A lot of our work is in big pumps and nozzles for the marine trade. It takes a lot of torque to get them apart and later assemble them to the proper torque settings. I'd advise anyone doing this kind of work to think about doing the same thing."

"Here's the nozzle room. Again you can see that we have all the necessary tools and test equipment. A wide variety of nozzles come in, ranging up to the "U" and "V" sizes. We can recondition and test them all.

"These fixtures (illustrated) are real time-savers when testing rebuilt nozzles. These came from Demco. The smaller one handles the "A" and "B" nozzles and the larger the "R", "S", "T" and "V" sizes.

"Say that you're reconditioning a set of large nozzles. You lap the seats, maybe reface the needles and then want to test them. You just clamp the nozzle in the chucking device, run down the desired spring pressure with the crank at the top and you can check them for leakage and spray pattern.

"Otherwise you have to put a big nozzle holder in a vise, assemble the unit, run down the clamping nut and then carry the assembly (they get heavy) to the tester to set pipping pressure and check out the work on the nozzle. If it's not right, you have to do it all over again. They've more than paid for themselves."

"About all that's left is that spic-and-span parts department of yours. Any ideas there?"

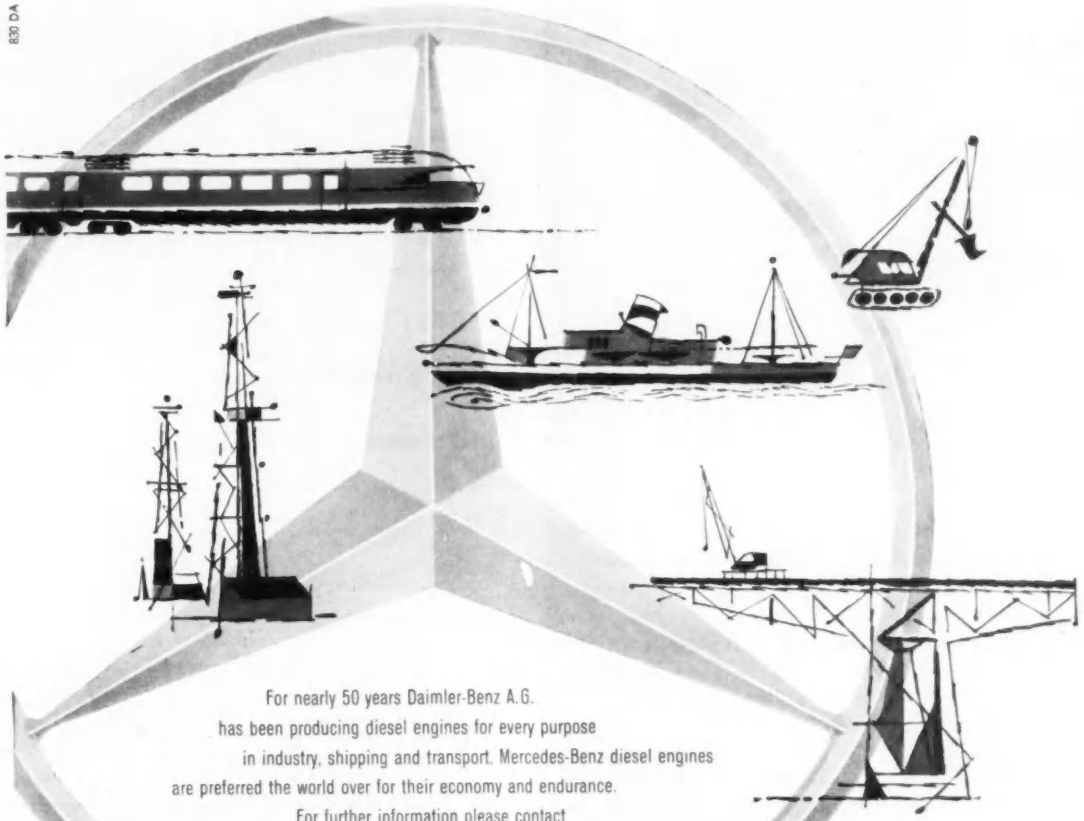
"Well, we're proud of it. You can make or break your operation right there. There's a lot of dollars tied up in those cabinets. Not enough of the right parts and you've lost a customer. Too many of the wrong parts and your working capital can wind up as a lot of high-precision, finely-finished junk.

"We have a card system to keep a perpetual inventory. The card tells what we have on hand, how many we use, what's on order and tells the location of the part.

"Another thing on records, we keep records on all the work we do by serial numbers or our identifying marks. If engine owners kept as good records, they'd have less trouble. One way that these help us is in warranty claims. We've been able to prove to people who brought us back equipment that failed that the work was done a year or two earlier than claimed—and even that we didn't do the work in the first place."

"I'm sure that these ideas and the pictures will be helpful to others. I can't resist this one — Manny, thanks."

830 DA



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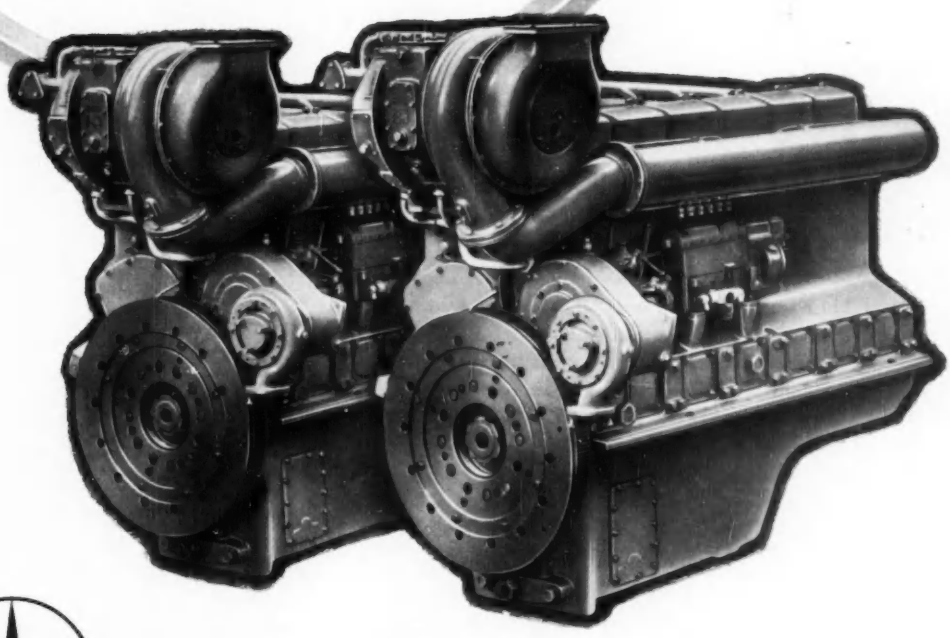
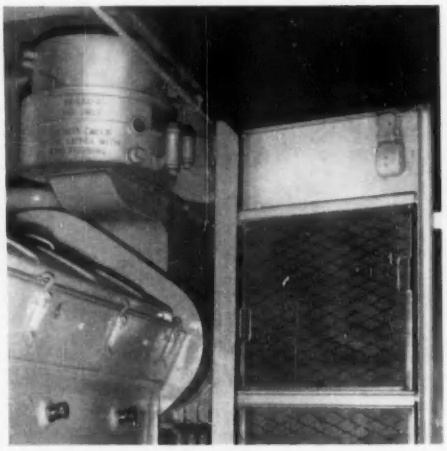


MERCEDES-BENZ



Two application arrangements are seen for Air Maze oil-bath type air filters. In photo at left, clean air leaves bottom of filter and enters GP9, EMD, 1750-hp locomotive diesel. Car body filters are also seen. In photo at right, clean air leaves at top of the filter then enters 1980-hp Cooper-Bessemer diesel on a General Electric U18C locomotive unit.

Secondary Filtration Protects Locomotive Diesels

Car body air filters are not enough. Engine intake air must be efficiently refiltered for proper engine protection.

A TYPICAL road locomotive takes in about 20,000 cfm of air at full speed. About 6000 cfm is used by the diesel, the rest goes to the air compressor, cooling fans of main generator, traction motor blowers, etc. This air is pre-cleaned by high-velocity type car body filters provided the locomotive end and side doors are kept closed.

If properly installed and maintained (periodically cleaned, rinsed, dried, oil wetted), these filters intercept and retain much of the dirt in the air. If filter maintenance is poor, or if the air's dirt load is unusually heavy, this type filter "unloads" part of its dirt to the engine room.

Obviously engine room air cleaned by these car body filters is not clean enough for use in the diesel. For maximum engine protection, engine air must be further filtered. It must be as clean as possible to prevent air-borne dirt from causing excessive engine wear.

Much is being done to determine what type and size of dirt particles contribute most to engine wear. However the smallest size particle which causes wear has not yet been determined. The least amount of dirt and smallest particle size possible is therefore most desirable.

Air-borne dirt can be identified as combustible or abrasive. Both contaminate lube oil, interfere with lubrication and induce wear. However the abrasive type gives direct wear.

Thus, an air filter should be selected which is: efficient at all engine speeds; operates efficiently as long as possible between servicing; has minimum resistance to air flow, consistent with efficiency; and can be easily cleaned.

One filter commonly used on locomotive diesels which meets these requirements is the Air Maze oil-bath type unit. This consists basically of a screen (diffuser) element which rests in a filter bowl (contains sump), a cover and a skirt. Design varies with engine type. However, its operating principle is simple.

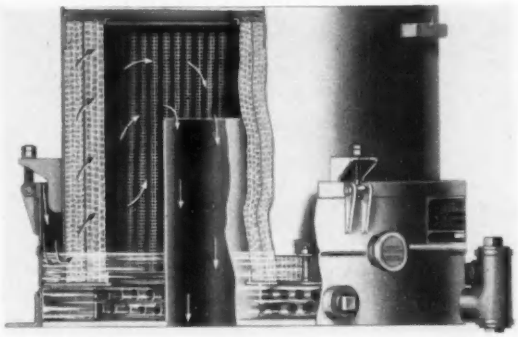
How Oil-Bath Filter Works

Dirt-ladened air enters filter around top of bowl and moves downward between it and the skirt housing. Here it disturbs and breaks the oil seal. This causes air-oil turbulence which increases as air reverses direction and passes under the skirt edge. At this point, some larger dirt particles drop out and settle to the bottom.

Oil and air concentration is now directed upward by a 2-in. rubber dam at the bottom and onto the diffuser (outer) section which causes complete mixing of air and oil droplets. As this air-oil mixture passes through the filter (inner) section, air is separated from the dirt-ladened oil.

The air stream constantly carries oil onto the diffuser screen and separator element washing down into the sump any dirt impinged on the filter element. This washing action keeps it clean at all times and is effective from 10% of filter capacity to its full capacity. Oil then flows back into the reservoir where dirt separates and settles to the sump. Only clean oil-free air passes out through the inner tube and a bottom or top outlet according to application arrangement.

While these filters have a higher initial pressure drop than most panel filters, the pressure drop at any specific air flow rate is constant. This is true whether the filter has just been placed in service or is about to be serviced after operating 90 days.



Entering air flows downward, breaking oil seal and reversing direction. First contact is diffuser screen, then filter. Air free from dirt and oil leaves at bottom here but may leave through top.

Servicing Oil-Bath Filter

Oil level and consistency should be inspected periodically. A bead in the filter bowl indicates correct oil level. This should be checked after engine is stopped long enough for oil to drain from the element (15 to 30 minutes, according to weather). To check oil level, remove cap from oil fill pipe and insert a measuring stick. Add oil only if oil level is below ½-in. from top of fitting. A sight glass for visual checking is found on later models.

Intervals between filter servicing vary according to type of service, air dirt content, etc. The majority of Air Maze oil-bath filters in service on more than 100 railroads are said to be operating 90 days without oil change and with little or no oil make-up.

These filters need not be disassembled for routine oil change. Each has two drain and two fill connections to the bowl, an upper and lower. Both drain plugs should be removed for draining dirty oil. Depth of sludge in sump may then be determined by removing a plug in an inspection coupling provided to facilitate this measurement.

Deposits vary in consistency and depth depending on type and quantity of dirt in the air. After a 90-day operating period, deposits in sump are generally between ⅛-in. and ¼-in. in depth. According to Air Maze, if this depth is less than ½-in., the filter may stay in service without cleaning. The screen also is said to require no servicing at this time since it remains clean due to the washing action of the oil.

One locomotive manufacturer, Alco, who applies these filters to 80% of current production, makes the following recommendations with reference to them. Oil level should be checked monthly until experience dictates otherwise. Later this period may be extended to 60 days. Changing of oil may vary from three to six months. The shorter interval should be tried first, however, until experience again shows otherwise. Sludge height should be checked at the same time. Whenever the layer of dirt reaches inspection hole, bowl should be removed and cleaned.

The element should seldom need cleaning. However, if diffuser screen shows dirt accumulation near the top, it indicates a lack of oil diffusing at the top of screen. This may be due to incorrect weight of oil or improper oil level. Cleaning of the element, if required, is done with kerosene, fuel oil, or an approved commercial grease solvent.

Alco recommends that the entire filter assembly be removed, dismantled and cleaned at least once a year. Before assembling filter, inspect the gaskets. Replace any that are worn. Alco also recommends that the three gaskets used should be bonded to the L-ring of bowl, top of element, and top of skirt housing.

When filter is assembled it should be refilled with clean oil through both vertical pipe fill connections. It can't be over- or under-filled this way since the top of vertical connections are even with the center of the oil level bead around the bowl. Replace fill plugs and be sure they are tight. Drain plugs must also be tight.

Operating Results

Typical reports from many railroads show that use of these oil-bath filters has greatly increased engine intake air cleaning efficiency. This has resulted in reducing piston ring, ring groove, and liner wear. In some cases liner wear was cut 45%. In one case, liners were reinstalled without reconditioning after 4-yr service totalling 182,000 miles.

In this same case, overhaul periods were extended from periods ranging from 18 to 24 months to 48 months after installing these filters. With the new filters, filter servicing was also extended from 30 to 90 days.

Reduction in parts wear resulted in need for less replacement parts, thus saving money. Extended servicing and overhaul periods resulted in less maintenance man-hours, also a monetary saving. In many cases these savings actually paid for the new oil-bath filters in a short period. Greater effectiveness of these filters really paid off.

The question frequently arises as to how to evaluate filter effectiveness. Here are several ways. A long-term method is to compare wear of piston rings, ring grooves, and liners after installing different types of filters on similar units operating in multiple or in the same territory and type of service.

Supplementing the long-term approach, inspection and analysis of air box deposits is also a basis of comparison. Spectrographic findings of the amount and kind of wear metals in crankcase oil is also very helpful.

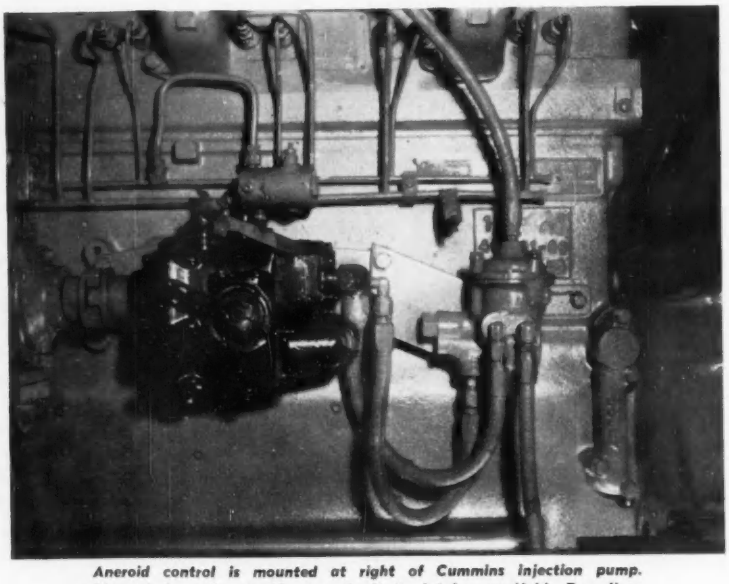
Summary

Car body filters on locomotives take some dirt out of the air but additional filtering is necessary to prevent excessive engine wear resulting in frequent overhauls and parts replacement. Special intake air filters must be used to make air clean enough for engine use. Oil-bath filters such as those made by Air Maze are doing an excellent job in this respect, judging by the reports covered above.

Select these filters with suitable capacity to avoid excessive engine intake air throttling and possibility of oil pull-over. Service them periodically to maintain their effectiveness. This will produce the desirable results discussed. Clean the air and engines will give better service for a longer time at less cost.

Cummins Controls Overfueling

Automatic control in Turbodiesel injection system, sensitive to air manifold pressure, limits fuel delivery during acceleration to control smoking.



Aneroid control is mounted at right of Cummins injection pump. Line at top of aneroid connects it to intake manifold. Two lines at left of control connect it to pump—one to pressure side and one carries bypassed fuel to suction side. Vent line leading down, connects space above oil level in control to engine crankcase.

TRAMPING on the accelerator is not the way to pick up speed of a turbocharged vehicle. Excessive smoking will generally occur. A careful driver will ease the rig up to speed, allowing the turbocharger to accelerate and supply air in step with the increasing fuel supply. But some drivers don't, despite instructions. Hence, controls.

Cummins now incorporates an aneroid control in their fuel injection system on turbocharged engines. It limits the amount of fuel injected until turbocharger speed is adequate to supply enough air for good combustion of full fuel delivery for turbocharged operation. In this way, control of overfueling with all its harmful effects is automatic and is not dependent on the skill of the driver.

This aneroid control is a separate component mounted near the injection pump. Basically, it is a fuel valve, which is controlled by intake manifold pressure. Its function is to limit the amount of fuel injected at the low end of the engine's load and speed range. It limits it to a quantity needed to produce the approximate power that the engine would develop if it were normally aspirated and operating at these conditions.

At below, say, 1200 rpm with light load there is little energy in the exhaust gases and the turbocharger is coasting and producing little if any positive air pressure in the intake manifold. Under these conditions, engine operation is very much the same as in a normally-aspirated engine. There is only sufficient air available to burn a moderate increase in fuel. As more fuel is burned, energy level in the exhaust gases increases. The turbine speeds up and the compressor delivers more air to burn more fuel. This "bootstrapping" soon produces capability of full turbocharged operation with adequate excess air.

So to prevent overfueling at the low end of the range, fuel delivery must be modulated by the aneroid control. This is done simply. Amount of fuel delivered to the injector cups depends on fuel pressure at the injector's metering orifice and the time available for fuel to flow. The time is set by engine speed so pressure is the only variable.

A line from the pressure side of the fuel pump leads to the aneroid control. An internal bypass is open until a selected positive intake manifold pressure is reached. A second line carries the bypassed fuel back to pump suction. This bypassing action reduces pressure of the fuel being delivered and limits the amount supplied each injector to about what a normally-aspirated engine would require.

A third line connects the top of the aneroid control to the intake manifold. When the manifold pressure reaches the predetermined pressure, indicating the availability of air to burn more fuel, the bypass is closed through the action of a bellows mechanism. Full pump pressure is restored and full fuel delivery for turbocharged operation commences.

The aneroid control's base is filled with lube oil that is changed when engine oil is changed. The fourth line to the control is a vent line connecting from above the oil level in the control to the engine crankcase above its oil level.

Once mounted and adjusted in conjunction with the fuel pump, the aneroid control automatically prevents overfueling. This simple device will eliminate objectionable smoking.

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Seventy pounds of diesel and natural gas engine catalogs and specification sheets have been referenced, digested and the pertinent information placed on a special computor.

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And Now — Diesel Taxi Cabs

Three diesel-powered Mercedes-Benz taxi cabs are now operating in the fleet of the Indiana Cab Co., South Bend, Ind. This is a "first" in this country but will probably not be the last—on the basis of reports to date.

THREE Mercedes-Benz 180-D's are now picking up fares in South Bend. The clean uncluttered lines, quality touches, slightly smaller-than-average size and the bucket seats up front set them apart from the other cabs in the fleet. But the biggest difference is under the hood—there's a compact 46-hp diesel there.

The German-built Mercedes-Benz diesel cars are no strangers to taxi service as close as Canada and, of course, are widely used in Europe. In fact, Bert Liss, cab company owner, picked up the idea in Europe. And South Bend is a logical place for such usage to start here. It is the home of Studebaker-Packard Corporation that is handling the Mercedes-Benz line in this country.

Now, why diesel-powered cabs? Mr. Liss says that putting them in service was "part of our continuing effort to provide good service with minimum cost of purchase, operation and maintenance". So here we have two objectives —"good service to their customers" at "minimum overall cost".

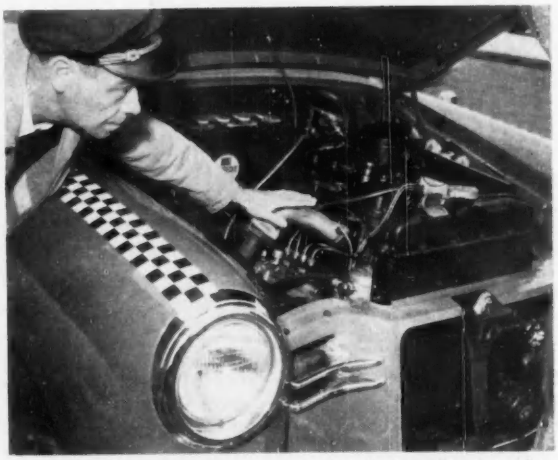
As far as customer service is concerned, reactions to comfort and ride have been extremely favorable. The cab accommodates four big passengers very comfortably. Drivers report that the cabs handle and maneuver easily in city traffic. They also like the car's performance and its "solid" feel.

Don't let the low 46 horsepower fool you. Maximum horsepower is not as important as "usable" horsepower at normal operating conditions. The superiority of the diesel's torque curve in the low end of the engine's speed range (where most city driving is done) provides ample torque for nimbleness in traffic. So performance in this service does not suffer.

Present indication is that the first objective has been met. Now, let's look at overall costs.

The Mercedes is not and was not intended to be in the low-cost car bracket. To the car's price must be added the premium for the diesel engine. In this case, total cost is about $1000 more in initial purchase price than for competing cabs. This is only part of the story.

Taxicabs in South Bend are averaging 40,000 to 50,000 miles per year. They are on the street two or three shifts daily. The mileage does not indicate total hours of engine operation because engines are kept running constantly, even for extended periods when parked at a cab stand.



Driver Bob McCarthy shows compact installation. Diesel, rubber-mounted on a sub-base attached to chassis, can be quickly dropped for major work or replacement. One spare unit in a fleet would keep cabs rolling with minimum downtime at time of heavy repairs.

Reason given is that power must be provided for radio operation.

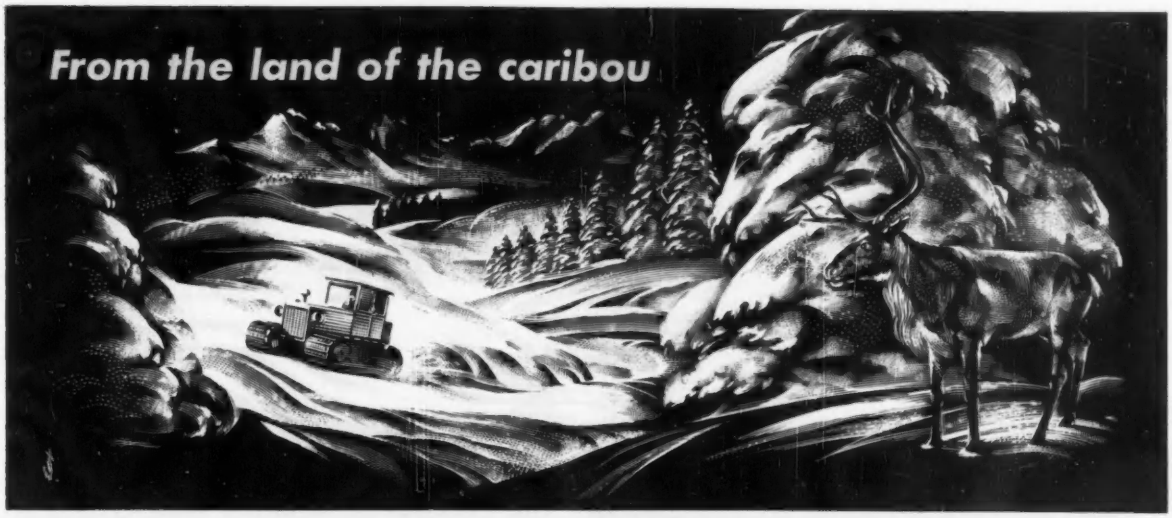
Despite this unfavorable condition, the M-B 180-D's are averaging 26 mpg. This compares with 9 mpg with the average taxicab and 12 mpg with Studebaker-Packard's "Econ-O-Miler" cab. Diesel fuel is costing Indiana Cab $0.19 per gal and gasoline between $0.29 and $0.32 per gal. Mr. Liss figures that he'll save over $1000 per year per cab on fuel alone.

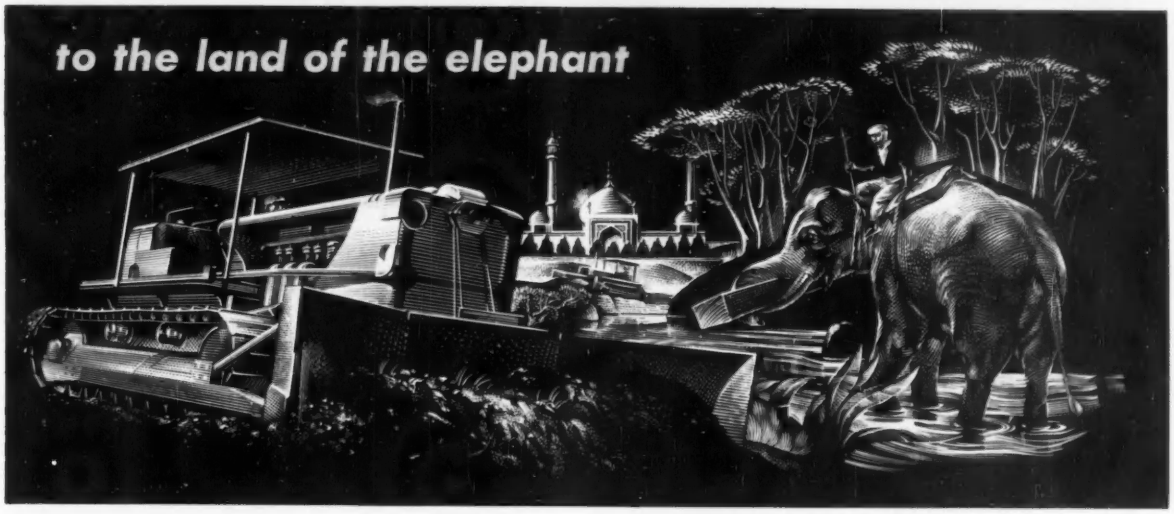
This would more than amortize the premium cost of the diesel cabs within a year—and diesels are not short-term proposition. Substitute your own local figures and see what savings are possible.

Incidently, if the cab company can get around this business of long idling—and there are ways—savings could be substantially increased. Studebaker-Packard claims up to 40 mpg in normal driving service and some owners are reporting even higher mileage. Plus this, maintenance periods, including oil changes, could be lengthened if long idling was curtailed. Idling is tough and "dirty" service.

It is too early to compare maintenance costs of the diesel cabs with the gasoline units. This will have to wait. However, based on other vehicular service, costs are about the same or favor the diesels. Diesel equipment consistently turns in twice or more the mileage between major overhauls and while these are more costly, it's rare for them to cost twice as much. Also, you don't get the out-of-service time of the intermediate overhaul.

On the long-range potential of diesels in this service, Mr. Liss is understandably cautious. Experience is limited. Yet he is optimistic and feels that from the cab operator's standpoint it is an impressive innovation. He also feels that it is a step in the right direction toward providing adequate taxicab vehicles. Requirements of this service are becoming more and more difficult to meet adequately with today's production cars. Such diesel vehicles could well be the answer.





Other Outstanding Shell Industrial Lubricants

Shell Tellus Oils—for closed hydraulic systems

Shell Talona R Oil 40—anti-wear crankcase oil for diesel locomotives

Shell Alvania Grease—multi-purpose industrial grease

Shell Turbo Oils—for utility, industrial and marine turbines

Shell Dromus Oils—soluble cutting oils for high-production metal working

Shell Macoma Oils—for extreme pressure industrial gear lubrication

Shell Voluta Oils—for high-speed quenching with maximum stability

Its performance and name are the same around the world

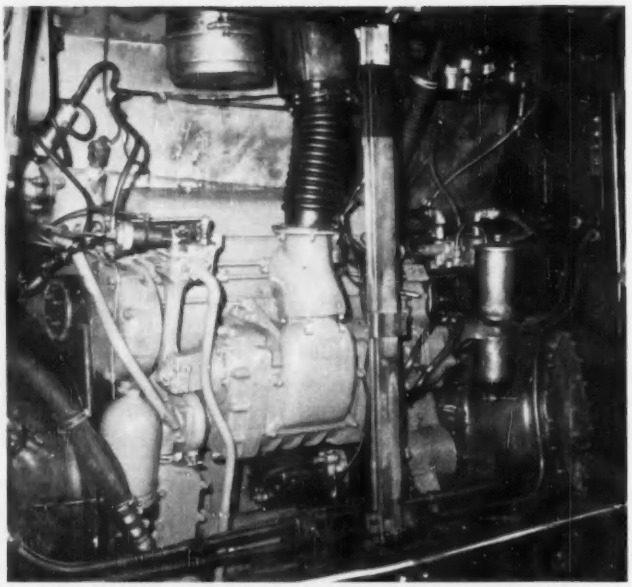
Shell Rimula Oil is a heavy-duty oil designed to solve the toughest lubricating problems in diesel engines.

One of these problems—excessive cylinder and ring wear—results from acidic combustion products. It occurs under all operating conditions, but is especially severe under low jacket temperatures. Rimula® Oil contains an alkaline additive that counteracts this acid wear. It remains stable under the widest temperature extremes encountered in modern operation. It keeps engine parts clean and operating efficiently over longer periods . . . effecting worthwhile savings in labor and parts.

Rimula Oil is available to your customers abroad. They can depend upon it for the most severe conditions of diesel operation. For full information, write Shell Oil Company, 50 West 50th Street, New York 20, New York, or 100 Bush Street, San Francisco 6, California.

SHELL RIMULA OIL

SHELL



The 4-71 GM diesel from bus 205 is seen reassembled and ready for service after overhaul. It was in continuous service since 1951.

PM is Cheaper Than Repair

A good preventive maintenance program is your best investment. Pennies spent today pay off in dollars tomorrow. If you need convincing, read this operating record. Figure what you'd save if you equalled this performance—then take action.

LEWISTON-Auburn Transit Company, Lewiston, Maine, firmly believes that it is cheaper to maintain than to repair vehicles. They initiated and then rigidly followed a sound system of periodic inspection and preventive maintenance. Part of the PM system consists of keeping accurate records and these show the results of their policy.

A complete set of performance and repair records are kept on each of the 37 passenger buses and have been for the past seven years. In 1951, the company placed 15 GMC diesels in operation. To date, this fleet has run more than five and a half million miles, each bus averaging 260 miles per day of stop-and-go driving, every day of the year except Sundays and holidays.

This is the story of the operational record of bus No. 205 but its extraordinary performance is not a rare exception. Thomas Bouchard, Superintendent of Equipment, said that each of the other 14 diesels has clocked between 275,000 and 431,000 miles without an engine change. One of them has hit 325,00 miles with absolutely no engine replacements of any kind.

Bus No. 205

The entry on bus No. 205, powered with a 4-71 GM diesel, shows that this vehicle ran 517,059 miles on the original rings, pistons and bearings. Assistant Maintenance Superintendent Omar Littlefield said:

"After half a million miles plus, we figured that No. 205 needed a whole lot of new insides, so one morning when she was a little hard to start, we stripped her down completely. After wiping the excess oil from the pistons and sleeves, we made a careful examination and couldn't find a crack, split or a clogged port anywhere." Mr. Littlefield pointed to the performance record book, saying:

"Taper of the cylinder liners, for instance, averaged wear of only 0.0028-in.; piston out-of-round averaged 0.0017-in.; and wear of the four connecting rod journals on the crankshaft was so small (average—0.0005-in.) that the crankshaft can be used again. Even the main bearings had worn only an average of 0.0007-in."

As the hardest-used vehicle, No. 205 had a yearly average of 6.5 mpg and ran a yearly average of 273 miles per quart of makeup lube oil. On the subject of fuel and lube oil, proper selection is considered an important part of the PM program.

Fuels and Lubes Picked for the Job

The best fuel or lube oil, in terms of overall performance and engine life, is largely a matter of operating conditions. Engines running at high engine speed and load can tolerate, say, a 2-D fuel with a moderate cetane number, a relatively high boiling range and perhaps a sulfur content running near the high limit. They might even get away with a No. 2 furnace oil.

Bus operation is different. Stop-and-go operation is normal. Average cylinder temperatures are lower than would be the case in a long-haul truck or even in an intercity bus. Higher cetane rating and better volatility (lower boiling points) are indicated for this relatively "cold" engine operation. Idling and acceleration will be smoother and since combustion will be more complete, deposits and lube oil contamination will be lessened.

Ambient temperatures also affect an engine's fuel requirements. When low, they certainly will aggravate a "cold" engine operation. And it gets—and stays—pretty cold in Maine.

Being aware of all this, Lewiston-Auburn Transit Com-

any uses a premium fuel of the No. 1-D type. The particular product used is Shell Oil Company's Premium "Dieseline". Better performance, plus increased engine life due to the lower rate of deposits and lube oil contamination, more than justifies the cost of the premium fuel.

Yet even with the best fuels, engines in this relatively "cold" bus operation tend toward a faster buildup of condensation products and acidity in the lube oil. This puts heavy demands on the lube oil if sludging and deposits are to be controlled.

For the last seven years, Shell Oil Company's extra heavy duty "Rotella" lube oil has been used exclusively in all Lewiston-Auburn buses. They point out three particular characteristics worthy of note: excellent detergent-dispersancy in both spark-ignition and diesel engines over the entire temperature range encountered in service; high resistance to oxidation and bearing corrosion; and high alkalinity that gives excellent anti-wear characteristics. Experience of Lewiston-Auburn Transit demonstrates the low rate of wear attainable with this highly alkaline oil.

Grade SAE 30 is used year round by all these buses. Since they are wintered in a heated garage, there is no need to change to a lighter oil.

Preventive Maintenance Procedures

It is easy to set up a PM system, even an elaborate one. You can get all sorts of help in making up suitable forms, check lists, etc. However, the best system in the world is useless unless it is conscientiously followed and the required work is done properly. This means close supervision, down to the last detail, and this is the secret of good preventive maintenance.

L-A Transit begins their procedure with examination of the driver's daily mechanical report, turned in at the end of his run. It may note anything from a jammed coin box to a leaking head gasket. In addition there is the daily mechanical inspection of all essential items. Necessary repairs are made immediately and no bus rolls out of the garage needing work done on it. Interiors are cleaned daily, exteriors washed every other day.

A complete inspection takes place every 3000 miles. This scheduled check covers 45 items from hand brake adjustment to engine compression. Included at this time are: greasing, oil change, oil filter change and air cleaner servicing.

Of course, there are some items that do not require inspection at such frequent intervals. In these cases, manufacturer's recommendations, modified by experience if necessary, govern. The most important point is that what ever the PM system calls for is done—done at the scheduled time and done properly.

Conclusion

Only one conclusion is possible. Results of this operation bears out the theory that it is generally cheaper to maintain than to repair vehicles. And the type of periodic preventive maintenance as practiced by the Lewiston-Auburn Transit Company obviously pays off.

Piston from diesel in bus 205 is seen right after removal from engine after 517,059 miles operation. Only excess oil has been wiped off. Note lack of carbon and good condition of the grooves and rings. Piston had very little wear.

Sleeve of diesel in bus 205 shows no clogged ports after being in service over ½-million miles. Measurements showed no appreciable wear. All sleeves were in a similar condition.

Exploded view of power head shows: the two crankshafts with their ball bearings, compounding gears, piston and conrod assemblies, finned cylinder with twin crankcases, blower, end plates and housing.

American MARC's Diesel Outboard

A lightweight outboard engine brings the advantages of diesel power to this gasoline-engine monopolized field. It also shows that diesels can be made small and light enough to challenge gasoline engines in many small-engine applications.

AMERICAN MARC has invaded the marine field with a lightweight outboard diesel engine. Entry of this unit into the field is expected by the company to make inroads into a market currently monopolized by gasoline engines.

Development of this unit is also an indication of things to come. It proves that the diesel can be built in sizes and weights equal to those of comparable output gasoline engines. Costs are coming down too. Entirely new fields can thus be opened for application of diesel power with its many advantages.

Some of these advantages are especially appealing to marine engine users. For example, safety is improved since the gasoline fire hazard is eliminated. Operation is more trouble-free due to the absence of an ignition system. These systems are particularly vulnerable to trouble on marine applications and are a consistent headache.

Plus being safer and more reliable, the diesel gives more economical overall operation than the gasoline engine. It's specific fuel consumption is lower and cost per gallon of diesel fuel is less than for gasoline.

The Outboard Diesel

Now for some details on the diesel outboard's construction and operating principles.

The basic engine is a 2-cycle, crankcase-scavenged opposed-piston diesel. It is available in 1-, 2- or 3-cyl (2, 4 or 6 pistons) models rated 7.5, 15, and 22 hp respectively, at 3500 rpm. Propeller speed is 1750 rpm. With a bore of 2½-in. and a stroke per piston of 1 7/8-in., a displacement per cylinder of 18.5 cu in. is obtained. Compression ratio is 20 to 1.

The cylinder has a crankshaft at each end. These are compounded through idler gears and power to drive the propeller is taken from only one crankshaft.

Anti-friction bearings are used throughout the engine. Ball bearings are used on the crankshafts and on the idler gears, needle rollers on the piston pins and heavy-duty rollers on the crankpins.

The engine uses American Bosch fuel injection equipment and fuel transfer pump. Metered fuel is injected directly into the combustion chamber between the two pistons. Fuel consumption for the one-cyl unit is quoted at about two quarts per hour at full speed. Lube oil consumption at this condition is about a quarter pint per hour.

The lube oil system used is the metered "throwaway" type. Minute quantities of lube oil are injected into the intake air, aspirated into the crankcase to lubricate the bearings and then carried with the scavenging air into the cylinder for its lubrication.

All models will be available either as air-cooled or water-cooled units. When air-cooled, a blower driven off the end of one crankshaft forces air over the deep fins around the center portion of the cylinder (combustion area) between the port areas.

Cylinders have three sets of ports. In addition to those for intake and exhaust, ports commonly referred to as "third ports" admit air into the crankcase while the pistons are moving toward inner dead center. As the pistons move away from each other, the third ports are closed, air is trapped in the crankcase and compressed. As the pistons continue to move apart, they open the exhaust ports and exhaust blowdown occurs.

Immediately following this, the intake air transfer ports are opened by the pistons and compressed air from the crankcase flows through them into the cylinder. This air completes scavenging of exhaust gases and supplies a fresh charge for the next cycle. Since transfer ports are located at each end of the cylinder, scavenging is accomplished from both ends of the cylinder at the same time. This porting arrangement is called "Vendaco" by American MARC.

These engines are started by a 12-v electric system. All standard outboard engine accessories will be available such as remote control, etc.

The many advantages of this diesel outboard engine over the gasoline models has made American MARC optomistic over their future outboard diesel sales.

ENGINEER'S FIELD REPORT

PRODUCT RPM DELO OIL

EDWARD KEEBLE CONSTRUCTION CO.

FIRM San Jose, California

RPM DELO Oil keeps tractor on the job 15 years

Still Working after 15 years using RPM DELO Oil in this D–8 Caterpillar operated by Edward Keeble Construction Co. Block, crankshaft, and most other parts of original engine are still in use. Another of firm's D–8's using RPM DELO Oil ran 12,000 hours without engine repairs. When torn down, maximum crankshaft wear was .004".

Crawler Crane, like firm's other heavy–duty equipment, uses RPM DELO Oil. Keeble operates 120 pieces of construction equipment—has as many as 30 jobs going at once.

GMC V-8 10-Yard Dump Truck (left), one of a new fleet of 12, also uses RPM DELO Oil. Mr. Keeble (right), says, "For the past 15 years we have kept our heavy–duty engines in top operating condition with RPM DELO Oil. In several instances engines have actually outlasted equipment."

Why RPM DELO Oils reduce wear—prolong engine life

- Oil stays on engine parts – hot or cold, running or idle
- Anti–oxidant resists lacquer formation
- Detergent keeps parts clean
- Special compounds prevent corrosion of bearing metals
- Inhibitor resists crankcase foaming

For More Information or field help with any fuel or lubrication problem, contact representative of any company listed, or write direct.

LUBRICATING OILS RPM DELO

TRADEMARK "RPM DELO" AND DESIGN REG. U. S. PAT. OFF.

STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20
THE CALIFORNIA OIL COMPANY. Perth Amboy, New Jersey

STANDARD OIL COMPANY OF TEXAS, El Paso
THE CALIFORNIA COMPANY, Denver 1, Colorado

By pressing the proper bar located in the row seen in the center of the Remington Rand Robot-Kardex unit, the correct record is automatically selected and delivered to clerk's fingers.

Waukesha's location file has eight Remington Rand Speed-o-Matic racks. It is used for screening orders and for determining the location of given items in the service parts warehouse.

Waukesha uses 18 space-saving, 6-draw Remington Rand Kompakt files for correspondence. Behind them are 45 Safe-Files protecting engine record cards and master routing cards.

Parts Control By "Push Button"

By Ortman Pederson

Service Mgr. — Waukesha Motor Co.

An engine without a supply of replacement parts is an orphan. To avoid this stigma, the right part must be available at the right time. Such parts control depends on records. As an engine builder gets more models and more engines in the field, the record keeping gets more complex. Here's how one company uses modern business machines to be sure you'll have no "orphans" around.

SERVING the aftermarket parts requirement is a necessity—and a problem. When this is done properly, both engine builder and customer profits. To the engine builder it means less-costly processing and a happy customer. To the customer it means prompt and accurate delivery of parts with minimum engine downtime.

Because of the great total number of units in the field and the large variation of models in different applications, parts control is a big and complex job. A sufficient number of the right parts must be stocked. Yet on the other hand engine design changes must be anticipated to avoid stocking of obsolete parts. Perpetual inventory, though complex, is the only efficient solution. The Waukesha Motor Company's use of business machines to accomplish this is typical of today's trend.

The Need For Parts Control

Waukesha is 51 years old. It has built over a million heavy-duty engines delivered to customers throughout the world. Many of the earlier models are still in service. Over the years, 350 different engine types have been produced. Our present catalog contains a total of 50 current models.

Today, our largest market is in the oil fields. But our engines are also found in volume in logging, railroads, automotive, agriculture, construction, road building, and general industry.

While much of our parts shipping consist of dealer stock orders, a large number of small emergency orders are also handled for these units. Therefore, we must know what parts we have at all times and have them in sufficient quantity to meet our customers' routine and emergency

requirements. In emergencies immediate shipment of parts must be made if the customer is to avoid a huge loss. A good example is when emergency repairs are needed on equipment drilling an oil well.

To give an idea of the scope of our parts operation, shipping weight totaled almost 7 million pounds in 1956. We stock some 25,000 different replacement parts valued at about $3,000,000 in our factory Service Div. inventory alone. It's no small task to know exactly what we have in stock and be able to refer to appropriate records without delay.

Robot-Kardex Units

Our inventory system is the responsibility of the Stock Control Section for service parts, functioning under Waukesha's Engine Service Div. Records covering our most active service parts are maintained in five Remington Rand Robot-Kardex units. The Robot-Kardex, a mechanized, electrically-operated file, saves 50% of the space needed to house these records in conventional Kardex units. Its use enables a control clerk to handle over 4000 records without moving from the chair.

Robot-Kardex records are kept in pockets housed in trays. A split card is located in the upper half of each Kardex pocket. On the right is a usage or service history card on which is recorded a monthly recapitulation of parts sales covered by the card. Space for recording five years of such activity is available. This part of the upper pocket card also contains spaces for superseding history of the item.

The card kept at the left of the upper pocket contains a service order record. An in-and-out balance card is kept in the lower pocket. An insert provides permanent indexing, while a moveable Graph-A-Matic signal is used to indicate type of stock.

To locate a given record, the operator presses a bar. The unit automatically selects the tray containing the desired record and delivers the tray in proper working position at the clerk's fingertips.

Less-active records are kept in conventional Mobile-Kardex cabinets. About 10,000 records are in the mobile units and 15,000 in the Robot-Kardex files. When an order for parts or replacement kits is received from a customer, it is screened by our Auditing Department for credit. Then it is classified by an order interpreter for price and discount.

The order next goes to our billing department where an order to ship to the customer is made up. A copy of the order which activates shipment of the material to the customer is supplied to the Stock Control Section. Such copies are accumulated in the Section for about 10 days. Then our Punched-Card Department produces a running list of the item for us.

The Stock Control Section uses this list for posting quantities to the Kardex record to determine whether any parts need be ordered and/or to make a permanent record of sales so that ordering can be done on a lead-time basis.

After this posting is completed, the clerks report all items which in quantity are under the re-order point. Analysts then decide on the amounts needed and appropriate orders are activated. This action is also noted in the file. As parts are received from the supplier or produced in our plant the balance on hand is brought up to date.

We produce most of the parts in our end product but some items and components are purchased from supplier companies. A separate card is used for these purchased parts. It combines usage with purchase information and has provision for recording price quotations. Records covering purchased and manufactured parts are interfiled in the Robot-Kardex on the ratio of 30% of the former and 70% of the latter.

A location file using eight speedac racks is used in our order screening process to establish the location of parts stored in 62,548 sq ft of warehousing space. By referring to this file, the location of given parts can be noted on each shop order. In this way, superseding parts are automatically picked up when a mistake in an order occurs.

After the shop order is processed it is turned over to the department or departments involved. After this it is routed to the general foreman of the stock room and Shipping Department, both of which are completely conveyorized.

In addition to pin-pointing item location, the screening process provides the Shipping Department with a much more accurate record. It eliminates the need for determining superseding items as an order is actually being filled, then meticulously re-checking the order.

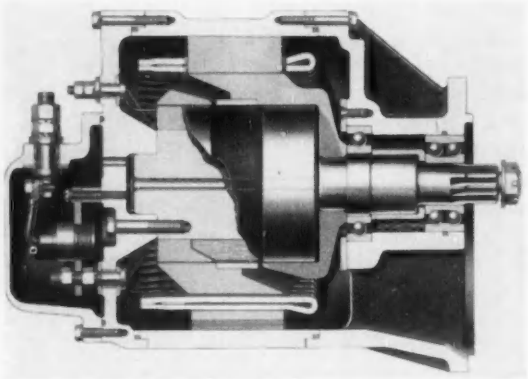
Overall, 10 important items of information are revealed by our Kardex records: balance on hand; amount on order and schedule; five-year record of usage; model, and number of pieces used on each model; product class; price of each part; type of item—service only or production; if service only, whether produced or purchased complete; classification of part—discontinued, slow-moving, or segregated; is it a "special" covering the peculiar requirements of a given customer?

The Robot-Kardex file is also used as a guide for keeping price books up to date. Its accuracy as to superseding status helps in this work. The price books are important not only to us but to our major customers and distributors. They must be kept up to date and accurate. The same is true of our illustrated parts book, maintenance of which is also greatly facilitated by reference to the Kardex records.

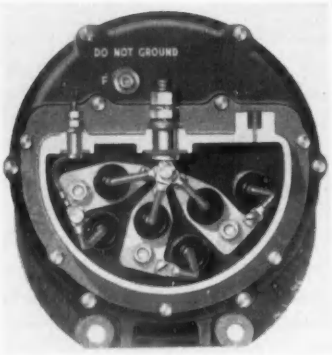
Personnel operating our Robot-Kardex units like their mechanical features. These have led to improved dispositions and much higher quality work. Absenteeism has been reduced. Speed of reference has eliminated ganging up at the files.

Previously, ganging up was a serious problem. The files are referred to at least 100 times a day just for answering customer inquiries concerning the availability of parts for shipment. Immediate answers made possible by the Robot-Kardex files pleases all customers—especially those whose equipment is in service on a penalty job.

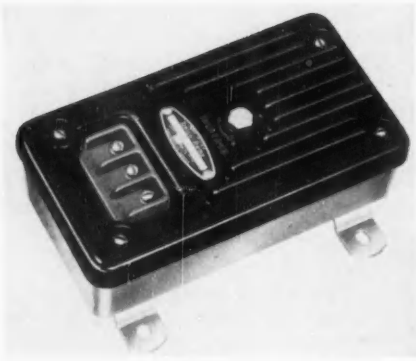
By being able to keep stock data so accurately, back-ordering has been reduced from 15% to 5%.

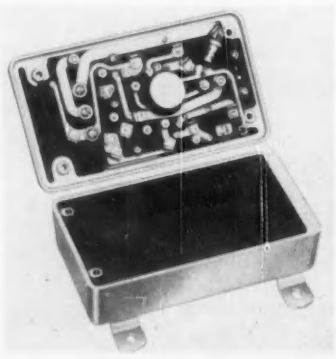


Generator section shows central stator, intermediate rotor and stationary windings. Cooling oil flow is from rectifier pocket (left) through stator to rotor passages and then to outer windings. Some oil goes to rotor bearings; some direct to sump.



Compact rectifier assembly with positive and negative terminals at top. Field connection is on generator end-plate. Oil enters orifice (top right).





Transistor regulator controls electrically. A look at "innards" shows elimination of all electro-mechanical devices. One adjustment controls output.

New Automotive Generator System Features —

- **High output**
- **Oil-cooling**
- **Transistor control**

AUTOMOTIVE generator systems have come a long way. Limited output and somewhat sketchy voltage regulation of early units are in sharp contrast with the most recent of modern units—an oil-cooled a-c generator with transistorized voltage control. Output? At engine idle —125 amps; at cruising speed—215 amps.

Two points emerge. First, tremendous technical strides have been made. Second, need for electrical power, closely regulated, has greatly increased as new jobs were assigned to the vehicle's electrical system.

Engineers of Delco-Remy and GMC Truck and Coach Division, both of General Motors, developed this new generator system together. Then, after extensive field testing in bus service, it was put into production.

The generator is totally enclosed, has no brushes or slip rings, and has built-in silicon rectifiers. The compact generator-rectifier assembly is cooled by a continuous flow of engine lube oil. This oil also lubricates the bearings.

Total enclosure and elimination of forced-air cooling gets rid of air-borne dirt problems. It also solves problems of where to put and how to cool external rectifiers, normally associated with a-c generators. Plus this, space is conserved.

The transistorized regulator is a new approach to voltage control. It holds close regulation electrically, with no moving parts. There is a single output adjustment. It is insensitive to vibration, affording flexability as to mounting, and temperature and humidity have no adverse affects on it. Maintenance is minimized by elimination of electro-mechanical components with their springs, hinges, contacts, etc.

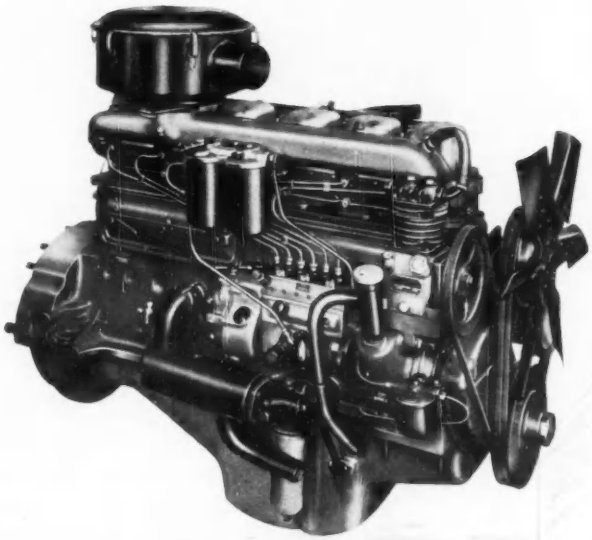
The generator is equally rugged. The well-balanced rotor is the only moving part. Electrical design and permissible high rotor speeds combine to give full voltage and high amperage capacity even at engine idle speed. Positive cooling and lubrication are "plus" factors.

Both components are in the nature of a "breakthrough" in the field of commercial automotive generator systems. They show how far the field has progressed since the starting motor replaced the hand crank.

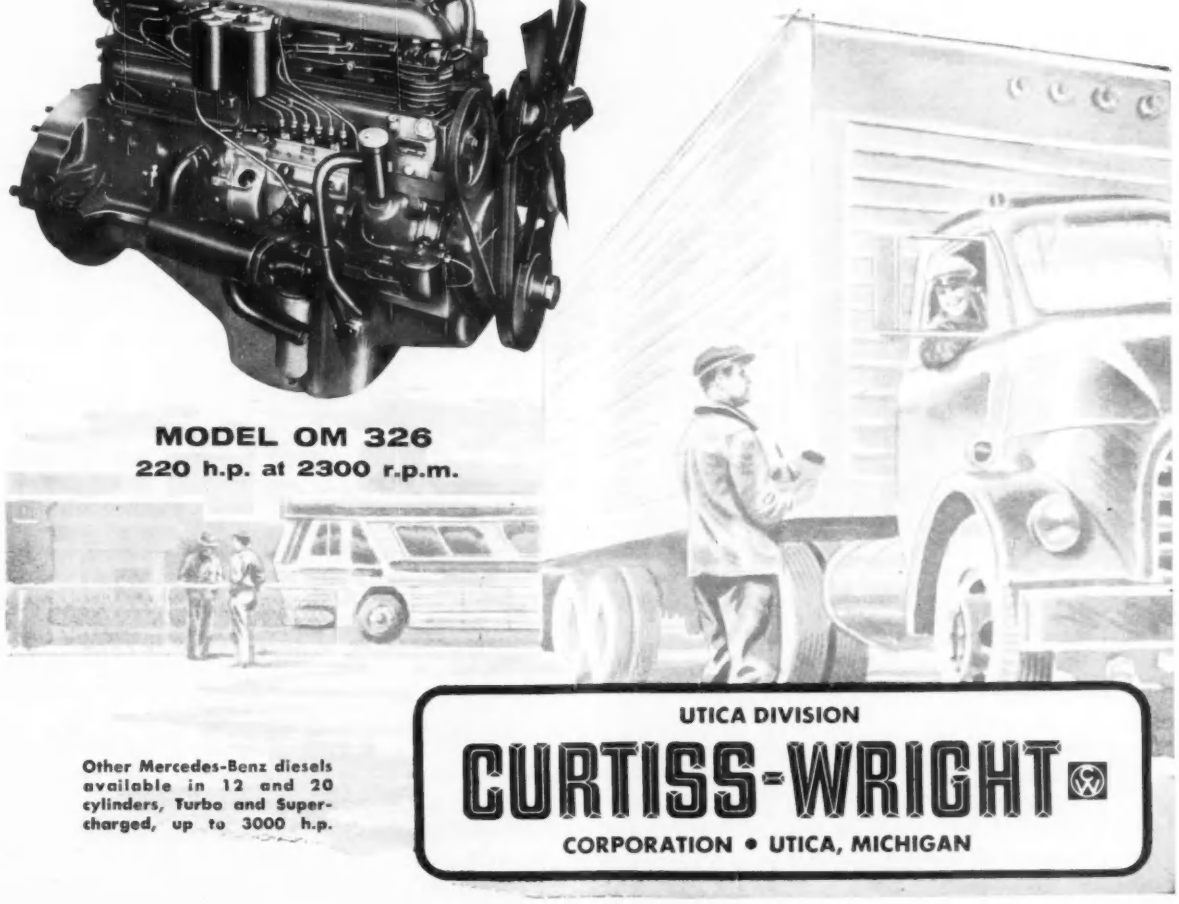
COMPLETE DEPENDABILITY with LOWER MILEAGE COSTS!

MERCEDES-BENZ
DIESEL ENGINES

Keeping them rolling at the lowest possible cost is of vital importance to the trucking industry . . . And just as important as economy is to management, the power under the hood is to the driver . . . With Mercedes-Benz diesel engines you get economical fuel consumption, simple maintenance, quiet operation and smokeless combustion . . . When the driver needs that added surge of power, he gets it with a Mercedes-Benz diesel . . . The effortless performance of the world famous Mercedes-Benz diesel engine, and its unusually long life, make it the finest engine available for owners who demand the very best.



MODEL OM 326
220 h.p. at 2300 r.p.m.



Other Mercedes-Benz diesels available in 12 and 20 cylinders, Turbo and Supercharged, up to 3000 h.p.

UTICA DIVISION
CURTISS-WRIGHT
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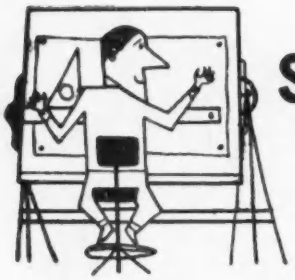


service section

Recent engine and equipment modifications, procedures and recommendations straight from the different manufacturers to you

Tightening GM Injector Fuel Lines

When installing injector fuel lines on all Detroit Diesel engine units, it is recommended that the connections be tightened only enough to prevent leakage of fuel. By following this procedure the flared end of the line will not become twisted or fractured because of excess tightening.

When all injector fuel lines are installed on an engine, the engine should be run long enough to determine whether or not all connections are sufficiently tight. Should any of the connections be found to be leaking, they should be tightened only enough to stop the leak.

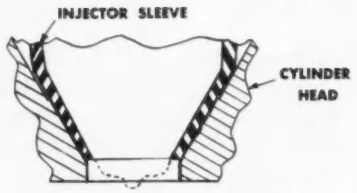
Bench Testing Vertically Mounted Model "D" Roosa Master Pumps

Drive shaft retaining ring #121-3 may be removed from pumps for bench test in the following manner:

1. Remove governor control cover, throttle and shut-off levers.
2. Remove the pivot shaft nut & washer.
3. Withdraw pivot shaft and remove governor arm, governor linkage hook and springs.
4. With a pair of 90 deg. offset snap-ring pliers, reach in through the governor arm cavity in the housing and spread the snap-ring. Withdraw the drive shaft and lift out the snap-ring.
5. Replace parts in reverse order.

The pump may now be operated on the test stand using the standard "D" drive adapters provided by the test stand manufacturer.

It is not necessary to replace the snap-ring when the shaft is reassembled since end thrust is absorbed in the engine when the pump is installed.



Injector Sleeve for Cummins H, NH and V-12 Engines

The injector sleeve, Part No. 8901-2, used in all 4⅞-in. and 5⅛-in. bore, 4-, 6- and 12-cyl engines has been shortened so the small end of the sleeve does not come flush with the milled surface of the cylinder head.

This change eliminates milling off the sleeve after it is installed, and reduces the stress in the cylinder head around the valve seat and injector cores.

Part number of the sleeve has not been changed and new and old-style sleeves are interchangeable. Installation procedure remains the same except for elimination of the final milling operation described above. After assembly the sleeve will be seated as shown in the sketch.

Superior Lubricants for Cat Engines

Through continued tests, better oils have now been developed to combat the problems encountered with higher output diesel engines and from the use of fuels with a high sulphur content. These improved oils are known as Superior Lubricants (series 3). This oil is different from Superior lubricants (series 2) in the type and quantity of additives used. It is now the only oil recommended for use in Cat diesels.

In addition to its recommended use in all Caterpillar diesels, they can also be used in hydraulic systems and oil clutch compartments. Foam inhibitors are also used in series 3 oils.

Crankcase lube oil change periods can be extended on some engines when this type oil is used. A new list of the crankcase lube oil change periods and filter change periods is now available from the Cat service department. A list, naming the petroleum companies and their brands of oils meeting the requirements for Superior lubricants (series 3), is also available.

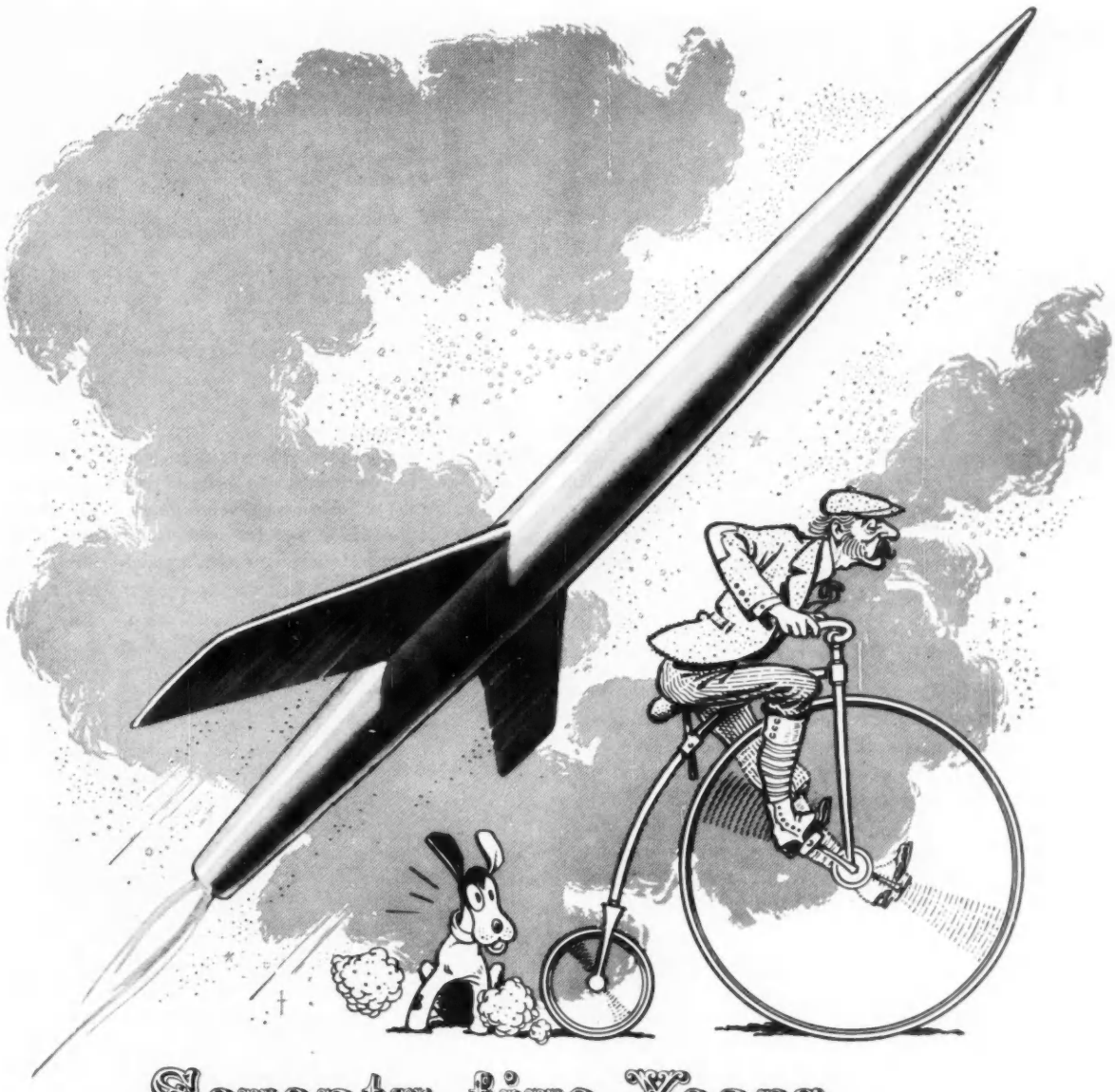
Shut-Down Of I-H Turbocharged Diesel

After an engine has been operating under full load conditions, a great deal of heat will be stored in its iron masses. If the engine is stopped abruptly, circulation of coolant and lubricating oil stops, and the heat stored in the various parts will be dissipated unevenly causing undue stresses in the engine parts.

In International Harvester's model 65 and 95 Payhaulers, it is important to idle an engine 3 to 5 minutes before shutting it down to allow it to cool evenly.

This basic rule of good engine operation is even more important in turbocharged engines. The turbocharger is the one unit containing bearings and seals that are subject to the high heat of combustion exhaust gases.

While the engine is running the heat is carried away by oil and water circulation, but if the engine is stopped suddenly the temperature of the turbocharger may rise as much as 100 degrees above that reached during operation. The results of this extreme heat may be seized bearings or loose oil seals.



Seventy-five Years ◇◇◇

TEN MILES an hour was "speed" in 1883 when Wyman-Gordon started to make forgings for the high-wheel bicycle. Through the 75 intervening years forgings have made important contributions to the phenomenal advances in propulsion. Progress from the first "horseless carriages"...from the early "flying machines"...to the supersonic speeds of today ...would not have been possible without forgings produced by the most advanced techniques of the day.

Wyman-Gordon is proud of its achievements in these fields and, as the largest producer of automotive and aircraft forgings, is prepared to accept the challenge of the future. Today, as for 75 years, there is no substitute for Wyman-Gordon quality and experience.

WYMAN-GORDON COMPANY

Established 1883

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WORCESTER 1, MASSACHUSETTS
HARVEY, ILLINOIS • DETROIT, MICHIGAN

industry news

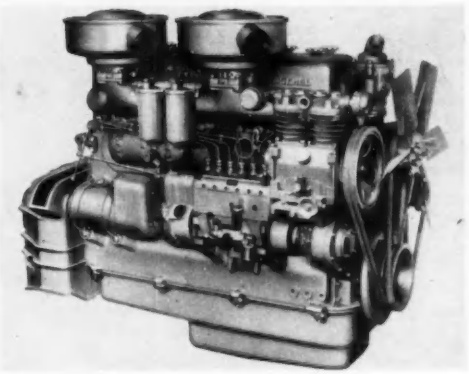
A & D Diesel Service Expands

"Open House" marked completion of expanded facilities for A & D Diesel Service of Brooklyn and Hempstead, N. Y. Extension of the Brooklyn shop doubled area, providing space for the expanding work load. Jim D'Aversa, owner, was host to a stream of customers and officials of companies he represents. Several members of the Association of Diesel Specialists also attended. D'Aversa was one "sparkplug" of the ADS and is currently treasurer. All attending wanted to see the improved facilities of this modern shop. Extension houses a model governor room, parts department, reception room and office. Relocation of governor and parts departments permitted more efficient arrangement of the fuel injection shop. Some new test equipment was installed and modifications made to existing equipment. The governor test stand shown is an example. Accurate rpm indicator was added at top. Also, on left panel, a sensitive pressure gauge, manometer and electronic vibration pickup were added.

Snow Removal In The Sierras

Now that winter is over and the results are in, here's an example of what snow-removal equipment was up against in the Donner Pass in California's Sierra Mountains. Three specially-equipped motor graders had to be used. These were made by the Pettibone N. Y. Corp., a division of Pettibone-Mulliken. The 20-ton per minute capacity units have auger-type rotary snow plows driven independent of the grader's traction power by two 145-hp, 4-cyl GM Detroit diesels. A third GM diesel provides traction power for the grader.

The graders are special 4-wheel drive, 6-speed units, in Pettibone's Speedmatic line. The grading blade, drawbar, circle and other blade controls have been eliminated to accommodate the saddle-mounted diesels. The engines powering the front-end-mounted "Sno-Go" attachment are equipped with torque converters and mounted just forward of the driver's cab.



Henschel Diesel To Be Exhibited

Arrangements have been made to exihibit a Henschel Type 6 R 1215 diesel engine at the 1958 National Truck, Trailer & Equipment Show to be held in Los Angeles May 15 thru 18. This is said to be the first showing of any Henschel product in the United States.

Engines of Type 6 R 1215 will be available for purchase by the trucking industry as replacement or original equipment and for stationary and marine use. These lightweight German-built diesels will be distributed from Los Angeles.

The 6-cyl 6 R 1215 developes 197 hp at 2100 rpm, has a displacement of 674 cu in, weighs 1590 lb and is water cooled.

new products . . Page 38

people and plants . . Page 40

new literature . . . . . Page 42

American MARC Gets Contract

A contract totaling $160,000 has been awarded American MARC Inc., California manufacturers of diesel engines and generators. The announcement was made by Denis Kendall, president.

The contract was placed by O'Keefe & Merritt for 268 light-weight, air-cooled, 6-hp diesel engines. The engines will be used to power generator plants for the U. S. Marine Corps. Delivery of these engines is to be completed within 90 days.

Mack Buses To Puerto Rico

Mack Trucks, Inc., has announced receipt of an order for 50 transit buses from Cia. Metropolitana De Autobuses, Inc., of Puerto Rico. These are for use in the City of San Juan.

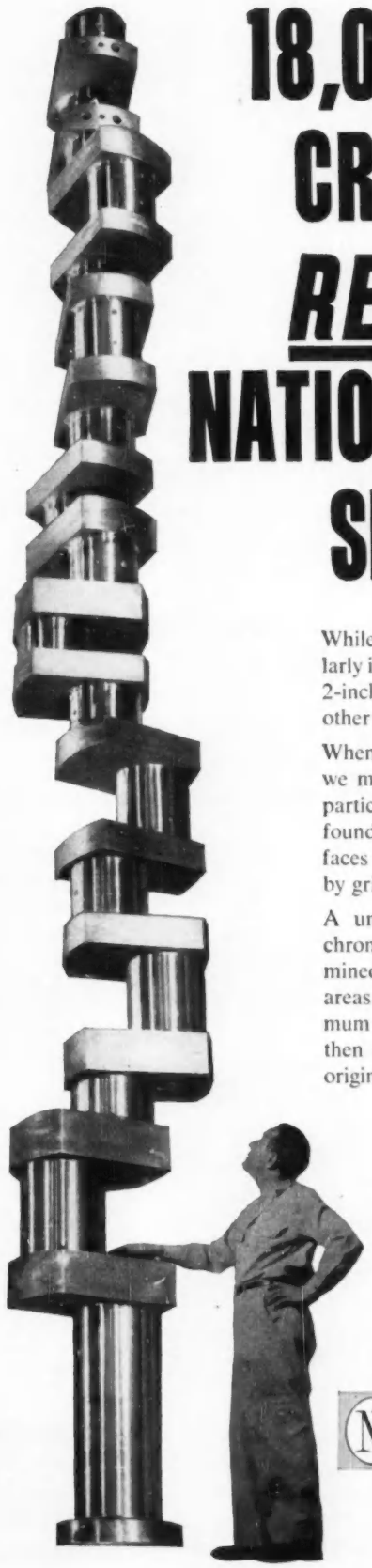
This brings to 190 the number of transit buses sold by Mack to Puerto Rico in the past three years.

The new buses will be 45-passenger capacity vehicles, powered with Mack's Thermodyne diesel engines, and specially equipped for service in Puerto Rico. Standee windows are tinted blue to prevent glare and special air scoops below and above the windshield and by the driver's side provide extra ventilation.

Pacific Fruit Express To Use New All-Purpose Mechanical Reefer

Pacific Fruit Express plans to haul fresh product, freight and frozen foods all in the same car, a new "all-purpose" diesel engine powered mechanical "reefer." This is now being built on its assembly line at Los Angeles. The new car, features new concepts in refrigeration and design and departs radically from standard models built to haul only frozen foods.

A total of 1000 costing more than $20-million, has been ordered. Half of the order will consist of 50-ft "super-giant" models and the other half will be of the standard 40-ft size. The cars have 6x8-ft sliding doors and metal flooring which permit pallet loading and handling of dead freight on return movements from the East and Midwest.



18,000 POUND CRANKSHAFT *REBUILT* BY NATIONAL FORGE SPECIALISTS

While National Forge specializes particularly in locomotive crankshafts, this 23-foot 2-inch compressor crankshaft was just another routine reconditioning job.

When this shaft arrived at National Forge, we made a thorough visual and magnetic particle inspection. After the shaft was found to be salvageable, all the bearing surfaces were prepared for chromium plating by grinding and grit blasting.

A unique plating machine deposits the chrome uniformly smooth to a pre-determined thickness—and away from fillet areas. After re-grinding—held to a minimum by accurate plating—the shaft was then finished ground and polished to the original specifications.

No other plating company has National Forge's experience in handling both new and rebuilt crankshafts. So, why not try National Forge Specialists on your next crankshaft rebuilding job?

NATIONAL FORGE & ORDNANCE COMPANY
IRVINE, WARREN COUNTY, PA.
Write for Bulletin Rc 3

industry news

Cummins Engine For R-18 "EUC"

Euclid Div. of General Motors Corp. has announced availability of a Cummins engine for the 18-ton rear dump, Model R-18. The Cummins engine (Model NH-6-BI) provides 220 hp and a top loaded travel speed of 26.7 mph.

Model R-18 is equipped with 5-speed transmission, 16.00 x 25 drive tires and hydraulic booster steering. Standard body carries 10½ cu yd. A quarry-type body with 11-cu yd struck capacity is also available.

Hercules Adopts New Sales Program

Hercules Motors Corp. has adopted a new program placing emphasis on engine sales by its distributor and dealer organizations. The new policy, parallels the company's modernization program in production.

The new program will place the company's nationwide distributor organizations in a position to sell to original equipment manufacturers in their territories at factory price. Local contact means better service for customers than the factory could provide in sales follow-up, warranty and parts.

Hercules will continue to contact and sell the larger-volume users of its engines.

A-C Advances In 1957

The Engine-Material Handling Div. of Allis-Chalmers made several noteworthy product introductions in 1957 and assured future product development by expanding research and engineering facilities.

A newly-designed and more powerful turbocharged diesel engine is now being used in the new HD-21 crawler tractors. A new 53-hp diesel engine is also being used in a new farm tractor.

Diesel generator sets rated 40 to 300-kw with generators made at A-C's Norwood Works, are now also available.

Other important advances include: the start of a $3¼-million development and research laboratory; introduction of a 10,000-lb-capacity lift truck; two new industrial tractors, with 4000 and 5000-lb drawbar pull, for use in factories and at airports; and introduction of a Power Shift torque converter drive for lift trucks.

Alco Ships Locomotives To Argentina

Alco Products, Inc. has already shipped 16 of the 130, 6-motor, 1800-hp, DL-540, diesel road-switcher locomotives ordered by the Argentine State Railways. Production was started in December 1957. Delivery will be completed this year.

The DL-540 is an export version of Alco's widely used domestic road-switchers, the 4-motor, DL-701 and the 6-motor, DL-702, introduced two years ago. The DL-540 is powered by Alco's 12-cyl, vee-type Model 251 turbocharged diesel that is standard in one of three sizes on all Alco locomotives.

Of the Argentina order, 30 locomotives will be placed in service on the D. F. Sarmiento Railroad, 55 will go to the General Mitre Railroad and 45 to the General San Martin.

for

PERFORMANCE
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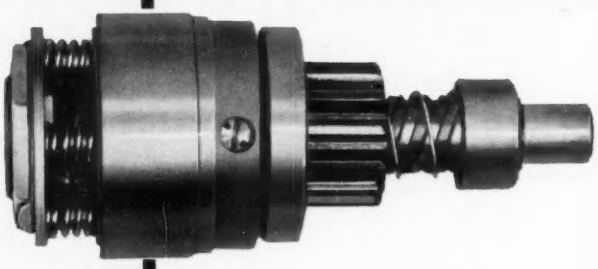
BENDIX STARTER DRIVES



In starter drives BENDIX means QUALITY. That fact, accepted by automotive men for almost half a century, is just as well-known to diesel engineers today. That's why the Bendix* Starter Drive is standard equipment on more diesel engines than any other make. It can be mounted more easily and in more positions. It requires no actuating linkage—the solenoid can be placed in any convenient position. It is simple in design, has fewer parts, needs fewer adjustments. No matter what your type of diesel, you'll be wise to specify and demand the Bendix Starter Drive for outstanding performance and economy. *REG. U.S. PAT. OFF.

Bendix-Elmira, N.Y.
ECLIPSE MACHINE DIVISION

Bendix
AVIATION CORPORATION

Davis Miller Calnon

Largest Cummins Distributor Discusses Sales Plans

K. W. Davis, president of Cummins Sales & Service, Inc., largest and oldest Cummins distributor recently met J. I. Miller, board chairman of Cummins Engine Co. and discussed sales plans for this year.

After the discussions, Davis and J. T. Calnon, vice president—sales, of the Ft. Worth, Texas distributor, projected 1958 sales of Cummins Sales & Service, Inc., above 1957's outstanding sales record in the trucking field.

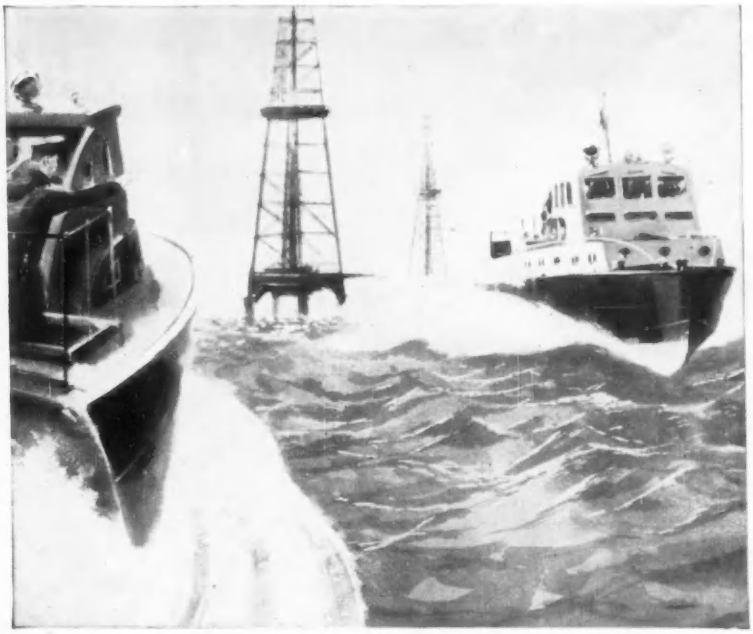
Last year in the Mid-Continent area served by Cummins Sales & Service, Inc., Cummins engines powered over 59% of all new diesel trucks registered.

Clark Bros. Co. Gets $9-Million Orders

Clark Bros. Co., one of the Dresser Industries, has received two orders totalling more than $9-million. The orders were from the Arabian American Oil Co. and the Asiatic Petrolcum Corp.

The Aramco order consists of six 9000hp Clark gas turbines and five barrel-type Clark centrifugal compressors. Five of the turbines will drive the compressors, the sixth will drive a generator. Ordered for Aramco's new gas injection plant at Ain-Dar, Saudi Arabia, the Clark units will be arranged in series to insure delivery of up to 200-million cu ft of gas daily.

The Asiatic Petroleum Corp. order covers seven Clark gas turbines and seven compressors for its associate company, Compania Shell de Venezuela. All 14 units will be installed in a gas conservation plant mounted on a permanent platform at Lake Maraciabo, Venezuela. These gas turbines are also in the 9000-hp range with a plant capacity output of 200-million cu ft of gas daily.



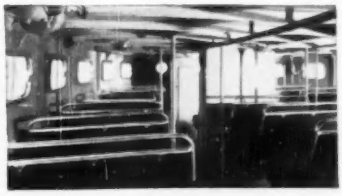
"The fastest crew boat on water"

Napier Deltic Power

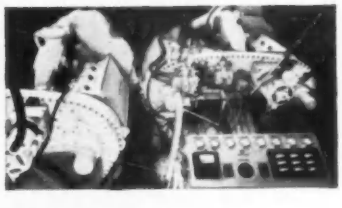
DELTIC reliability, power, endurance and space-saving compactness are the reasons why really look-ahead oil men are revising their ideas of crew transportation. DELTIC-powered crew boats, carrying up to 50 passengers are speeding between land and oil rigs at 35 m.p.h. with plenty of power in hand for bucking wind and tide.

DELTICS ARE UNIQUE

The triangular arrangement of the opposed piston two-cycle DELTIC gives more power for less space and weight than any other equivalent diesel. The DELTIC is designed as a removable marine powerplant for scheduled maintenance. This gives highest utilisation with smooth, safe sea-going qualities in all weather conditions due to twin-engined reliability.



BIGGER PAYLOADS. The Deltic—most powerful engine for its size and weight in the world—makes possible this 50 passenger 35 m.p.h. crew boat.



EASIER MAINTENANCE The Deltic is designed for easy maintenance—e.g. pumps replaced without retiming. Entire packaged power unit interchangeable for major overhauls.

NAPIER DELTIC MARINE DIESELS

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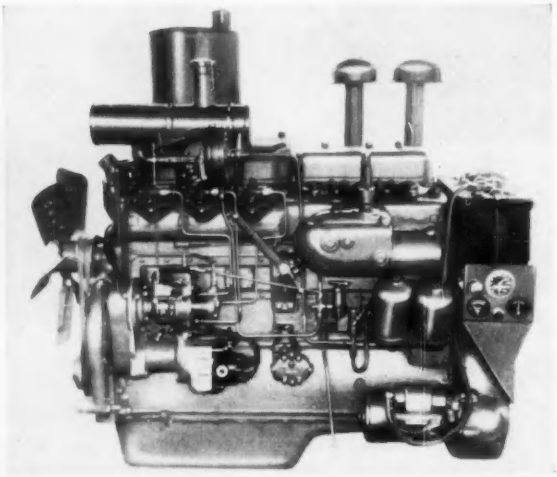
new products

Portable Control Station For Locomotive

A portable control station has been developed which permits operation of diesel-electric locomotives from any position in the cab. The unit, made by General Motors Diesel Ltd., London, Ont., measures 5 x 8 x 9-in. and weighs 14 lb.

The portable control box is equipped with a combination throttle and reverser handle, a brake lever, an emergency stop push-button and a combination "dead man" control and carrying handle. A 14-conductor flexible cable plugs into a receptacle mounted on the control box and connects to the regular control stand. The combination throttle and reverser handle makes it impossible for the operator to change from forward to reverse unless the throttle is at idle position.

A similar device for use on yard switchers with pneumatic throttle control has been developed as well as one for locomotives with electrical throttle control.



Oliver Crawler Tractor Line

The latest from the Industrial Div. of The Oliver Corp. is a new line of OC-4 crawler tractors. This new tractor features increased power, both gasoline and diesel models and transmission improvements.

The new OC-4 engine develops 29 hp in either the diesel or the gasoline model. The OC-4 diesel is said to be the smallest on the market today. Both engine types have been designed so there is 85% interchangeability of parts. The engines are also interchangeable with each other in the tractor.

One transmission improvement is the "Travel-Reverser". With this auxiliary transmission the operator can reverse the OC-4, maintaining the same speed in reverse as in forward by de-clutching and pulling back a lever.

A speed-reduction development, "Slo-Lo", permits the operator to reduce any of the four forward and backward speeds by 50% by de-clutching and pulling back a lever.

Schramm Offers Diesel-Driven Compressor

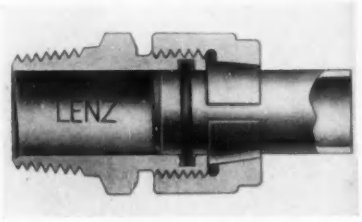
A new diesel engine-driven air compressor of en-bloc construction, delivering 125 cfm, has been announced by Schramm, Inc. This addition to the Schramm line, known as the 125 Pneumadiesel, is described in detail in their Bulletin PD-57.

New features of the Pneumadiesel include: a distributor fuel pump; 12-v starting equipment; and starting on gasoline, then switching to full diesel.

The unit is available in skidded and 2-wheel mountings and also as an integral part of the new Pneumatractors and Pneumatractor Rotadrills produced by Schramm.

The en-bloc construction makes the compressor more compact and it is reported to be 300 pounds lighter than an average unit of comparable capacity.

A high rate of interchangeability of parts minimizes service problems—95% of parts are interchangeable between engine and compressor.



O-Ring Hydraulic Fitting

The Lenz O-ring tube fitting made by Lenz Co. is used on vacuum, air, and hydraulic systems. It seals by means of a standard stock O-ring. A split tapered sleeve holds the tubing in place when the clamping nut is drawn up.

Excessive wrench torque is unnecessary because the seal does not depend on the tightness of the nut. The nut fits loosely on tubing for ease of assembly. The higher the pressure the greater the grip of the tubing, and the greater the seal of the O-ring. No exact tube length is necessary. There is no metal to metal seal.

New Jet Cleaner For Heavy-Duty Use

Products of two leading manufacturers of heavy-duty cleaning equipment are combined in the recently introduced Clayton-Sellers Steam and Hydraulic Jet Cleaner. The makers are Clayton Mfg. Co. and Sellers Injection Corp.

This unit, the Model CS 628, is for use in heavy-duty industrial cleaning jobs in off-highway, marine, railroads, truck transport, petroleum, aircraft and similar industries.

The units provide either steam cleaning for high impact, heavy-duty, close-up cleaning, or a hot hydraulic jet stream for cleaning distant surfaces, particularly those covered with caked mud, grease, ice, etc. Used as a steam cleaner, it produces 280-gph at 90 to 100 psi.

As a hydraulic-operated cleaner, the unit delivers 500 to 600 gph at 220 psi to 210°F, using a ¾-hp motor. This pressure, according to the manufacturer, permits the operator to clean hard-to-reach cranes, frames, bulkheads, chassis, etc.

(*Continued on Page* 44)

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Complete industrial wrench and hand tool service for

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SNAP-ON TOOLS CORPORATION
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people and plants

G. M. Perry

V. L. Snow

Euclid Sales, Engineering Appointments

Mr. R. Q. Armington, general manager of Euclid Div., G. M. Corp. has announced the following appointments in sales and engineering. G. M. Perry is now director of sales. He is responsible for all sales activities, liaison with G. M. overseas operations and will retain his position on the Board of Directors of Euclid (Great Britain) Ltd.

V. L. Snow becomes director of engineering and is responsible for all aspects of product engineering.

G. E. Armington, one of Euclid's founders is resigning as director of engineering to develop other business interests.

Alexander Dreisin

Chief Engineer at Allis-Chalmers

Alexander Dreisin has joined the Allis-Chalmers Mfg., Harvey Works, Harvey, Ill. as chief engineer of the newly-organized A-C Diesel Fuel Systems Department.

During the past four years Mr. Dreisin has been chief engineer of the Micro-Precision Div. of the Micromatic Hone Corp. Prior to that he served as assistant chief engineer of the Diesel Engineering & Mfg. Co.

P. Wallach

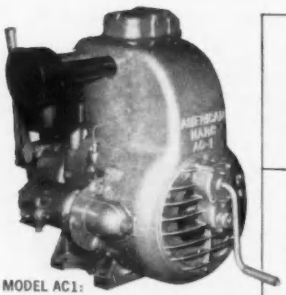
Nordberg Promotion

Appointment of P. Wallach as district manager of the Great Lakes territory of the Engine Div. of Nordberg Mfg. Co. was announced by R. W. Bayerlein, Div. vice president. Wallach will make his headquarters at a new district office established in The Agents Building at 3537 Lee Road, Cleveland. He joined Nordberg two years ago as a sales engineer and has concentrated on the marine, utility and pipeline markets.

He succeeds G. B. Wright, who resigned March 15th.

LIGHTWEIGHT CHAMPIONS

by America's largest manufacturer of AIR-COOLED DIESELS



MODEL AC1:
Air-cooled, one-cylinder, four-cycle. 6.5 BHP @ 1800 RPM. Wt.: 220 lbs.

MODEL KBA-605: 7.5 KW permanent magnet generator mounted to AC2 diesel engine. Wt.: 550 lbs.

MODEL AC2: Air-cooled, two-cylinder, four-cycle, V-type 14 BHP @ 1800 RPM. Wt.: 350 lbs.

AMERICAN MARC Inc. is the acknowledged leader in the field of lightweight, air-cooled diesel prime movers for all uses requiring 6.5 to 15 BHP. Prominent in the American MARC line is the new permanent magnet generator, available from 3 to 7.5 KW output. (AC or DC, and industrial three-phase). American MARC also manufactures rotating armature generators, refrigeration power units and diesel pumping units of various capacities for industrial and marine installations.

AMERICAN MARC INC.
DIESEL ENGINES
1601 West Florence Ave. Inglewood, California
Dept. P-58 Telephone OR 8-7174 6-104

Synchro-Start
SPEED SENSITIVE SWITCHES

SYNCHRO-START MODEL GA-3 will open or close three independent sets of contacts at three different speeds and are suitable for installation on AND20005 aircraft tachometer drive pad. The units are adjustable while running. Standard governors can be furnished to trip points between 1,200 and 6,000 R.P.M. Speeds above or below these points must be referred to our Engineering Department for special considerations.

These speed sensitive switches are available for various types of drives.

One, two, and three switch units employ the same basic governor flyweight principle which has been used successfully in SYNCHRO-START OVERSPEED GOVERNORS during the past fifteen years.

Request Bulletin 504

SYNCHRO-START PRODUCTS, INC.
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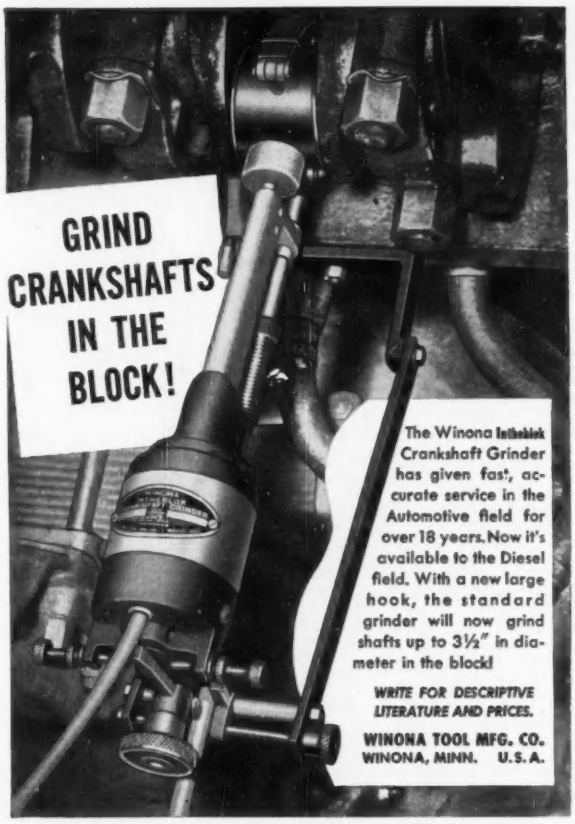
GRIND
CRANKSHAFTS
IN THE
BLOCK!
The Winona Internal Crankshaft Grinder has given fast, accurate service in the Automotive field for over 18 years. Now it's available to the Diesel field. With a new large hook, the standard grinder will now grind shafts up to 3½" in diameter in the block!
WRITE FOR DESCRIPTIVE LITERATURE AND PRICES.
WINONA TOOL MFG. CO.
WINONA, MINN. U.S.A.

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UNIVERSAL
INJECTOR TEST STAND—

For Testing all Unit Injectors in One Fixture. Makes Plunger and Bushing Tests on all General Motors Unit Injectors.

KIENE HYDRAULIC TEST PUMP — For making all conventional Tests on Nozzles. Photo shows use with Universal Injector Test Stand.

KIENE CONNECTOR NUTS — For convenient Attachment of Equipment to Test Stand or Test Pump. All sizes Connectors available.

KIENE PORTABLE
TEST EQUIPMENT

An entirely new and different product for the Diesel Industry offering features never before available in the field of Injection and Hydraulic repair and Servicing tools. Kiene Injector Test Stand and Hydraulic Pump give you all operating advantages of existing tools in addition to introducing many new and exclusive features. Kiene Products are Portable, Light Weight, Compact, Rugged and Revolutionary in Design. They are engineered to give the Field Service Man adequate tools for on the job diagnosis and quick repair of valuable Diesel Equipment.

SAVE MONEY —
SAVE DOWN TIME

Write for Bulletins KTP-50 and UTS-10

KIENE DIESEL ACCESSORIES, INC.
10352 PACIFIC AVE., FRANKLIN PARK, ILLINOIS

Commercial Filters Corp. Adds New Representatives

L. Anderson, J. Berg and J. Kerber have been added to the Chicago sales staff of Commercial Filters Corp. The company manufactures Fulflo and CFC filtration equipment. Headquarters for all three men will be at 6409 West North Avenue, Oak Park, Ill. Mr. Anderson will serve as a special representative on OEM accounts in addition to industrial sales.

Promotion At American Bosch

J. R. O'Donnell has been appointed specialty sales manager of American Bosch Div. of American Bosch Arma Corp. He will have full responsibility for the sale and promotion of the Hydrotor hydraulic cranking system recently acquired by Bosch.

Mr. O'Donnell joined the Cleveland Regional Sales Office of American Bosch in 1953 and subsequently became manager of that office. Mr. T. J. Kiely, of the Chicago Regional Office, will succeed Mr. O'Donnell as manager of the Cleveland Office.

Perfect Circle Advances Two Men

Two promotions in the engineering department of Perfect Circle Corp. have been announced by W. B. Prosser, president of the piston ring company. M. Estey, who has been assistant chief engineer of the engineering division, has been named executive engineer. He will have full responsibility for all matters pertaining to direct operation of the division. R. W. Heid, Jr. has been promoted to assistant chief engineer in charge of replacement engineering activities.

Cummins Distributor Expands Facilities

New facilities of Cummins Idaho, Inc. have been opened to provide more service to diesel engine and parts customers. The new building is located on East Highway 30, Boise, Idaho. It has a shop area of 2400 sq ft, a parts section of 2000 sq ft, and office space of 1000 sq ft. The facilities include six truck bays, enclosed chassis dynamometer and an enclosed engine dynamometer.

FM Export Div. Mgr. Retires

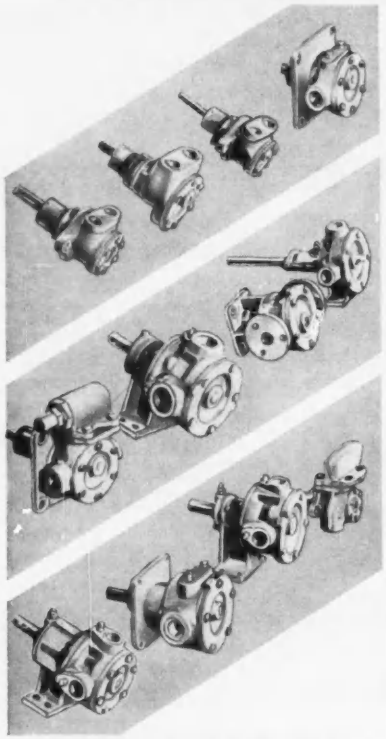
Retirement of C. W. Linscheid, manager of Fairbanks, Morse & Co.'s Export Div., has been announced by R. H. Morse, Jr., president. Mr. Linscheid has been with F-M & Co. since 1919. He has been manager of the Export Div. since 1931. Mr. Morse also announced that J. A. Cuneo, vice president, foreign operations, is transferring from Chicago to Fairlawn, N. J. to assume direct management of the Export Div.

Hercules Expands On West Coast

In a move to expand sales and service operations on the West Coast, Hercules Motors Corp. has assigned L. G. Downey to direct western activities from its headquarters in Los Angeles. He is a veteran of 30 years with experience in sales and engineering. He will supervise development of sales of Hercules engines as well as distributor and dealer sales and service in 11 western states, the Canadian western provinces and Alaska.

(Continued on Page 47)

WHAT PUMP DO YOU NEED?



VIKING DESIGNS PUMPS TO FIT YOUR SPECIFICATIONS

CHECK VIKING Pumps when you are designing equipment that requires positive lubrication, a flow of coolant, or the transfer of a liquid or semi-solid. Viking Pumps, designed to fit your equipment, can help you save space ...plan more efficient operation... and, in many cases, cut costs of equipment.

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Please send me your suggestions.
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for handling .....
at ..... G.P.M., under ..... psi
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See Our Catalog in Sweet's Product Design, and Plant Engineer's File

new literature

Folder On Mecrome Liners

A new 4-page folder on the Mecrome process for chromium plating cylinder liners has been published by Metal Finishers, Inc.

Entitled, "Let's Put the Microscope on a Mecrome Liner", the brochure illustrates by means of micro-photographs, the uniformly distributed intermediate porosity obtained by the process. Photographs cover dial bore gauge, microscopic, visual and micrometer inspection procedures.

Industrial Stethoscope Bulletin

An 8-page bulletin which describes a new "Airsonic" industrial stethoscope made in Belgium, is available from M. Paquet & Co., Inc. The instrument is reportedly capable of picking up sounds of all frequencies, and reproducing them at desired volume.

In addition to testing all parts of diesel engine and other machinery in operation, this device can also be used for checking and detecting leaks in gas and water pipe lines, hydraulic systems and testing the soundness of castings and welded joints.

A.E.D. Announces 1958 Industry Directory

Associated Equipment Distributors have announced publication of their 1958 Industry Directory. The book is reputed to be the most complete reference available of construction equipment distributors, manufacturers, products and trade names.

This 382-page volume contains company names, addresses, key personnel and phone numbers for over 2000 bonafide firms in the construction equipment industry.

It is divided into four separate sections: distributors, manufacturers, products and trade names.

Hyster D4 Backhoe Movie

A new 16mm sound and color motion picture on the Hyster D4 Thydraulic Backhoe is now available. It explains and illustrates design and performance features of the Backhoe that make it suitable for solving the digging problems encountered by contractors, gas companies, and public works departments.

Hydraulic Hose and Fittings Catalog

Rubber-covered double wire-braided hose and reusable Hoze-lok fittings are covered in a newly issued Catalog 4430. Included are stainless steel braided hose for non-magnetic service and perforated cover hose for coal shooting. Rubber cover of hose does not have to be stripped off when assembling fitting onto hose.

Catalog 4430 is available from W. D. Wynant, Parker Fittings & Hose Div., Parker-Hannifin Corp.

Catalog Gives Generator Specs and Service Datu

Pacific Mercury has just completed a 28-page catalog detailing specifications, service and maintenance data on their new lines of generators and flasher lights. Diesel-powered electric plants, and a-c, d-c generators occupy five sections of the catalog.

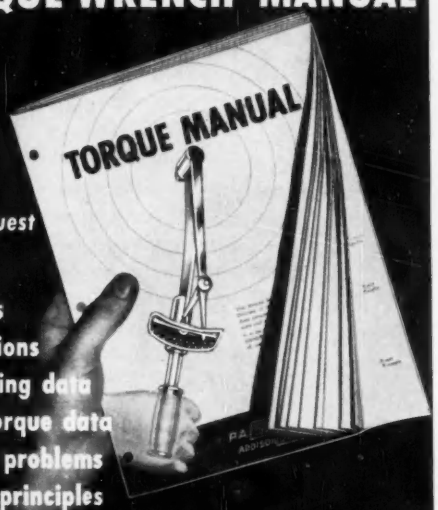
Information is given on how to select a generator for specific applications and accessory equipment for both generators and flasher lights. Sales policies, distributor and sales warranty data is also included.

ASME Power Test Codes

Three new power test codes have been published by The American Society of Mechanical Engineers. They cover fuels for diesel engines and heat generation, deaerators and water-cooling equipment.

The 84-page "Test Code for Diesel and Burner Fuels" contains methods for the collection of samples and determination of all physical and chemical properties for the value of liquid fuels when they are used to generate heat or power. Gasoline or other fuels used in spark ignition engines are not included. The Code contains a new feature—introduction of each test method by a brief discussion of the significance of the test.

"TORQUE WRENCH" MANUAL



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Formulas
Applications
Engineering data
Screw torque data
Adapter problems
General principles

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ADDISON QUALITY ILLINOIS

Manufacturers of over 85% of the torque wrenches used in industry

Preventive Maintenance Data Sheets

Euclid's "Preventive Maintenance" manual contains many sheets (in bound form) for recording repair and maintenance data on their overhung scrapers. Included are 16 maintenance check lists, one for each period of inspection. Each sheet lists about 25 items that must be checked at that particular time and what is to be done.

Repair and maintenance record sheets are furnished for listing repairs, costs, etc. Monthly data sheets are included for recording hours of labor, fuel and lube oil used. Preventive maintenance control report sheets are supplied for daily recording of total operating hours, when inspection is due and when it is finished.

Benefits gained through use of this manual are more than worth the 60 cents cost for it.

Engine Torque Specifications

A 24-page booklet available from the P. S. Sturtevant Co. lists the manufacturer's torque specifications for diesel and gasoline engines used in trucks and busses and gasoline engines used in domestic and foreign make cars.

Torque specifications are given for cylinder heads, main and connecting rod bearings, flywheel to crankshaft, manifolds, valve springs and for gasoline engines, data on spark plugs. A brief explanation is also given of what generally happens if these parts are not torqued to the required specifications.

The $1 charge for booklet is an excellent investment.

(*Continued on Page 49*)

STOP *that* NOISE NOISE NOISE NOISE NOISE NOISE

—from the discharge to atmosphere of air, steam and other gases, with a Burgess-Manning Snubber. They are available with such plus features as: spark arresting; air cleaning; heat recovery; and surge control.

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- Cummins Injector Tester
- International Harvester Injection Testers
- General Motors Injector Testers
- Injection Pump Calibrating Stands
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- Engine Overhaul Stands
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- GM 71 Engine Tools

76 Pages—275 Illustrations
56 Engine Reference Tables
26 Parts Lists

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COMPANY_____
STREET_____
CITY and STATE_____

AD-15

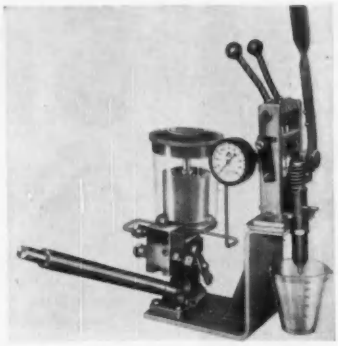
new products

(*Continued from Page 39*)

Line of GM Testers And Tools Extended

Bacharach Industrial Instrument Co. has expanded its line of service tools for General Motors diesels. Included now are items for testing and servicing GM 71T engines and injectors used in these engines. More than 250 items are offered, the majority of which are also suitable for servicing GM Series 71 engines and other Detroit Diesel engines.

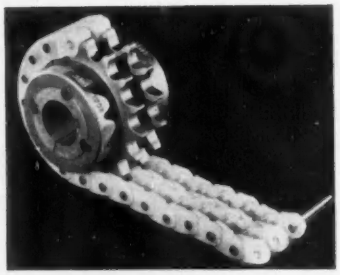
Injector tester shown handles all GM Series 71 and 71T injectors and



can be readily adapted for testing GM Series-110 and 51 engine injectors. Catalog 52 covering these items is available.

New Flexible Nylon Coupling

The addition of a new, lubrication-free nylon coupling to its line of flexible couplings has been announced by Morse Chain Co., Ithaca, N. Y. The chain element of the new coupling is constructed of nylon segments and stainless steel pins and is corrosion resistant. It can be disassembled or connected at any link without special tools, and fits standard, stock steel roller chain sprockets. Hardened steel sprockets are no longer necessary. The new coupling handles loads from fractional to 40 hp and speeds from 500 to 5000 rpm.

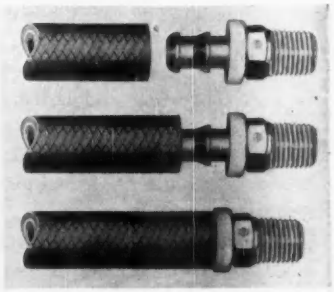


Weatherhead Introduces Push-On Hose Ends

Weatherhead Co., Fort Wayne Div., claims faster, easier on-the-job hose assembly installations with their new "Barb-Tite" push-on hose ends. Skiving of hose is eliminated.

Precision machining of the new barbed insert assures a positive grip leakproof seal to withstand working pressures up to 250 psi. Minimum burst pressure is 1000 psi.

"Barb-Tide" hose ends are designed for repeated use. They are applical to a wide range of industrial and automotive low-pressure applications such as air, fuel and lube oil lines and vacuum gauge lines. They are available in all popular end styles in sizes from ¼-in to ¾-in I.D.



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Sales Office: 14820 Detroit Avenue, Cleveland 7, Ohio
West Coast: 5025-29 W. Jefferson Blvd., Los Angeles 16, California
Canadian Distributors:
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AP174-820

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we'll be glad to bill you later

people and plants

(*Continued from Page* 41)

Waukesha Buys Le Roi Commercial Engine Business

The Le Roi Div., an operating unit of Westinghouse Air Brake Co. Milwaukee, Wis., has announced the sale of assets of its engine business to Waukesha Motor Co., Waukesha, Wis. The line of internal combustion engines made by the Le Roi Div., along with certain inventories, special tools and equipment, make up the major assets involved in the transaction.

F. Zielsdorf, general manager of the Le Roi Div., stated that removal of this engine line will permit them to concentrate on the air compressor and tool business and to obtain a greater share of the markets for this type of equipment.

Brown Boveri Gets New Regional Mgr.

A. C. Conger, an engineer in the N. Y. office of Brown Boveri Corp. has been appointed Northwest regional manager in charge of a new office in Portland, Oregon.

He will be responsible for all operations in Oregon, Washington, Montana, Idaho and Alaska. He will concern himself with engineering and sales of all Brown Boveri power generating distribution, transmission and industrial equipment.

He will occupy Suite 701 at 811 S.W. Sixth Avenue in Portland.

PIE Relocates

Pacific Intermountain Express opened its PIE Building at 14th and Clay Streets, Oakland, Calif., on March 17th. It transferred its general offices from 299 Adeline Street to the downtown Oakland center.

The remodeled 3-story building houses 300 PIE employees and executives. They will occupy two floors and the southerly half of the basement in the 104,000-sq ft building. The northerly half of the basement and the 15th Street side of the first floor have been converted into a public garage. Service shops are on the 14th Street side of the first floor.

Burgess-Manning Appointments

Mr. J. S. Kolb has been assigned sales engineer in the N. Y. District Office and Mr. L. G. Halla Sales Engineer in the Chicago District Office of the Burgess-Manning Co., Industrial Div.

Jack Kolb has served as field sales engineer in the Chicago area for the past three years.

Louis Halla comes to the Burgess-Manning with a broad experience. His past associations include the Walker Process Equipment, Inc., and Wallace & Tiernan, Inc.

Hydrotor Franchise Given

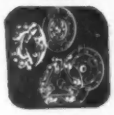
Fluid Mechanics, Inc., Cleveland, Ohio, have been franchised as central distributors for the Hydrotor hydraulic starter by American Bosch Arma Corp.

Fluid Mechanics will assist equipment and engine distributors and dealers in Ohio, in the sale and installation of Hydrotor systems. R. A. Hardy, vice president of Fluid Mechanics, states they have moved into a 3500-sq ft facility to better house a stock of starter equipment which fits all engines.

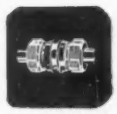
ROCKFORD

LONG LIFE Heavy-Duty POWER TAKE-OFF

GIVES CHOICE of CLUTCH TYPES

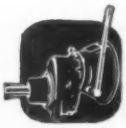

Small Spring Loaded

Heavy Duty Spring Loaded


Oil or Dry Multiple Disc

Heavy Duty Over Center

Power Take-Offs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No Pilot Bearing
Once-a-Year Lubrication
40,000 Hour Main Bearing
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ROCKFORD Oil Field type POWER TAKE-OFFS are furnished with single or double plate, gear tooth drive clutches—with organic or Morlife® cerametalic friction material. A single plate Morlife clutch provides the torque capacity of a double plate organic lined clutch. Morlife's 400% longer life and 50% better heat disbursal also increase the efficiency of oil field equipment.

BW SEND FOR THIS HANDY BULLETIN
Gives dimensions, capacity tables and complete specifications. Suggests typical applications.

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OFFERS

SASKATCHEWAN POWER CORPORATION SURPLUS MATERIAL FOR SALE AND REMOVAL

Offers are invited by Saskatchewan Power Corporation for the purchase of the following surplus materials:

1. **Located at Moosomin, Saskatchewan:**
   (a) One Busch-Sulzer, 5 cylinder, model 5SE21, 2 cycle, 875 bhp, 300 rpm, diesel engine, Serial 991, direct connected to General Electric 750 KVA, 3 phase, 2400 volt, 60 cycle alternator, Serial 5393962, and 15 KW 125 volt compound wound belted exciter, Serial 1703599.
   (b) One Busch-Sulzer, 5 cylinder, model 5SE21, 875 bhp, 300 rpm, 2 cycle diesel engine, Serial No. 992 direct connected to General Electric 750 KVA, 3 phase, 2400 volt, 60 cycle alternator, Serial No. 539363 and 15 KW, 125 volt compound wound belted exciter.

   IF Items (a) and (b) are sold together, all switchgear, instruments, and auxiliary equipment with the exception of the cooling radiators will be included in the total price.

2. **Located at Nipawin, Saskatchewan:**
   (a) One Fairbanks Morse 6 Cylinder 32E14, 450 bhp, 300 rpm, 2 cycle diesel engine, Serial 896079 direct connected to Fairbanks Morse 375 KVA 3 phase, 2400/4160 volt, 60 cycle alternator, Serial 564776 and 10 KW 125 volt shunt wound exciter, Serial X70947.

3. **Located at Wynyard, Saskatchewan:**
   (a) One McIntosh-Seymour 6 cylinder model 6B46, 1250 bhp, 164 rpm, 4 cycle air injection diesel engine, Serial No. 2003 direct connected to General Electric 1250 KVA, 3 phase, 2300 volt, 60 cycle alternator, Serial No. 5163258 and 20 KW, 125 volt shunt wound belted exciter lister, Serial No. 120D255.

Offers will be considered with respect to all the above equipment or any components thereof. Any inquiries may be directed to the respective local officers of Saskatchewan Power Corporation or to Mr. H. Linfoot, Superintendent of Diesel Generation, Saskatchewan Power Corporation, 1739 Cornwall Street, Regina, Saskatchewan.

Parties submitting offers must enclose certified cheques in the sum of 10 per cent of the amount bid.

Parties purchasing equipment will be required to remove the same within one month after completion of sale.

All offers are to be submitted in writing addressed to the undersigned at the head office of Saskatchewan Power Corporation, 1739 Cornwall Street, Regina, Saskatchewan, and are required to be in the hands of the undersigned not later than the 1st day of June, 1958. Offers will be opened privately at 10:30 a.m. on June 1st, 1958.

The highest or any offer will not necessarily be accepted.

H. Linfoot,
Superintendent of Diesel Generation,
Saskatchewan Power Corporation,
1739 Cornwall Street,
REGINA, Saskatchewan.

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new literature

(Continued from Page 43)

Superior Marine Diesel Data and Specs

Bulletin #112 (12 pages) covers performance data, features, and specifications of the Model 60 and Model 80 Superior marine diesels. It has been issued by the White Diesel Engine Div.

Included are two pages of charts on the potential of heavy fuel operation and the performance curves of these vertical in-line models. Illustrations detail the engine styles and construction refinements.

Guidebook Explains Hydraulic Systems

A new revision of Technical Bulletin B-4, "Hydraulic Fundamentals and Industrial Hydraulic Oils" has been issued by Sun Oil Co.

This 44-page book is a practical introduction to the principles of hydraulic systems with illustrated explanations of valves, pumps, motors, torque converters and accessories. Oil characteristics, oil selection and trouble-shooting are also covered.

Allis-Chalmers Bulletins

Operating advantages and engineering features of the Allis-Chalmers HD-6 diesel-powered crawler tractor are described in a new Allis-Chalmers 14-page catalog (MS-1251). Numerous graphs, charts, and views of the tractor's principal components are given.

Design features that provide production advantages for Allis-Chalmers TW-360 bottom-dump motor wagon are described in a new three-fold catalog (MS-1269). Action photographs, catalog views and specifications help tell the TW-360 story.

Allis-Chalmers line of redesigned synchronous generators is described in bulletin 51B8909. Ratings range from 30 to 150 kw at 1800 rpm and from 50 to 300 kw at 1200 rpm.

Diesel Parts Catalog

Diesel Parts Co. of California's catalog, Volume 47-1958, lists their stock of engine parts for the GM "71", "268A", and "567". This stock originates from government surplus and manufactured replacement parts. The catalog is illustrated and gives complete description of each part and part number according to it's order in the engine, as well as a numerical check list.

(Continued on Page 50)

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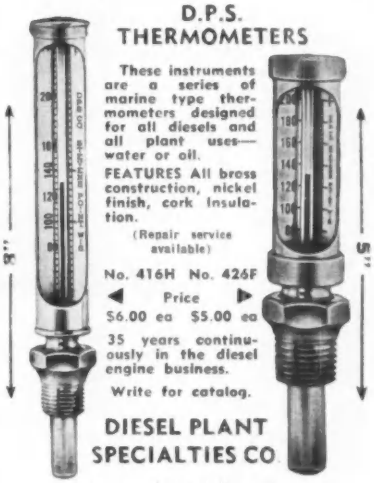

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SACO
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new literature

(Continued from Page 49)

Folder On Mechanical Force Gauges

A 6-page folder describing its complete line of mechanical force gauges has been issued by W. C. Dillon & Co., Inc., manufacturer of scientific testing instruments. Comprised of 23 action photographs of Dillon force gauges in actual use, the folder also includes complete specifications, dimensions and capacities.

Fram Filter Equipment Catalogs

Illustrated, 2-color catalogs, describing their 1958 line of filter equipment have been announced by the Fram Corp.

These are: General Products Catalog, 16 pages; Air Filter Catalog, 36 pages; and Filter Specifications Catalog, 76 pages.

The new catalogs have been completely reworked, condensed, simplified and cross referenced to facilitate their use and to save time.

Balancing Machine Described

A 4-page folder issued by the Raydyne Corp. describes and illustrates their dynamic balancing machines. These are used for balancing crankshafts, traction motor armatures and similar rotors for motors, generators, turbochargers, etc. Rotors of any size, shape or speed can be balanced accurately and economically.

Data Book On Flexible Tubing

A technical data booklet has just been made available to designers, plant engineers and purchasing agents by the Pennsylvania Flexible Metallic Tubing Co.

The 36-page booklet covers selection and application data on all types of flexible tubing and hose and many types of couplings which can be used with the tubing.

This booklet has been designed to place in the hands of key men throughout industry a ready-reference to flexible metallic tubing.

Solid Film Lubricants Described

A new catalog, #LB-6-1157, describes in detail, eight different solid film lubricants and their respective applications. It is available from Electrofilm, Inc. This catalog presents a complete family of solid film lubricants formulated to solve lubrication problems which arise under conditions of: high temperature (to 1500°F); low temperature (—300°F); corrosion resistance; high loads (225,000 psi); high speeds (to 30,000 rpm); etc.

Ross Brochure Describes Expanded Facilities and Products

A new illustrated brochure describes the men, facilities and products of American-Standard, Ross Heat Exchanger Div. Titled "This is Ross —Ready for You," the publication shows how Ross puts primary emphasis on engineering in its role as a heat transfer specialist. Numerous illustrations demonstrate the broad range of applications for Ross equipment in practically every industry.

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Accelerated Engine Test Comparison Proves

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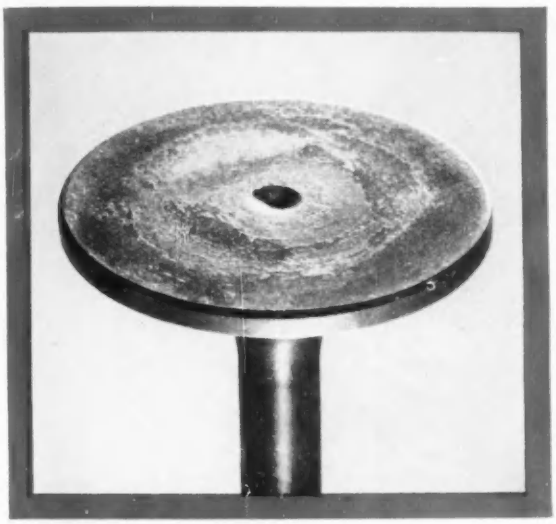

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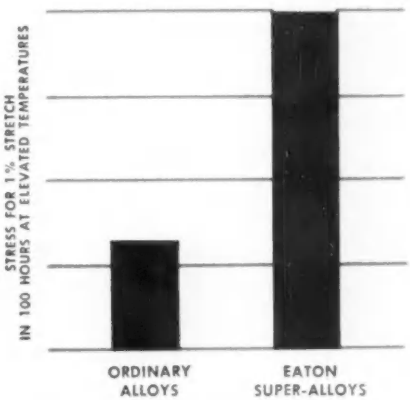
To meet the requirements of extreme heavy duty service, Eaton has developed unique production methods for the making of exhaust valves of super-alloys possessing exceptionally high hot-strength and corrosion resistant properties. These Eaton Super-Alloy Valves are "custom tailored" to meet the specific requirements of the engines for which they are designed.

As a pioneer in the development of valve designs and materials which have added thousands of miles to valve life expectancy, Eaton has made such important contributions as sodium cooled valves, seat-faces of high-alloy materials, aluminized valves, and now super-alloy valves.

If you build engines—either gasoline or diesel—for heavy duty applications such as motor trucks, buses, earth moving machinery —it will pay you to discuss the advantages of Eaton Super-Alloy Valves with our engineers.



The results of laboratory tests represented by the above graph indicate the superior hot-strength of Eaton Super-Alloys over commonly used exhaust valve materials.

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LUBRICATION CASE STORY ON THE NEW WORTHINGTON AT INDEPENDENCE, IOWA

Situation: Gene Williamson, plant superintendent, had a decision to make when the Independence, Iowa, Municipal Light Plant installed a new 3600 Horsepower Dual-Fuel Worthington last year. What lubricating oil to use? Other equipment in the plant was lubricated with STANODIESEL Oil M. Performance was excellent. Lubrication technical service performed by men with experience and training for the job likewise was excellent.

What was done: The decision was made to install STANODIESEL Oil M. Now after 3,780 hours of operation, there are no regrets. There are no signs of wear.

STANODIESEL Oil M is refined from the finest-quality base stock. Additives help the oil resist viscosity change, keep engine parts clean. Other additives control foam, make it possible for oil to reach and hold protective film on even the most difficult to lubricate parts.

What you can do: Get all the facts about STANODIESEL Oil M from your Standard Oil lubrication specialist. There's one near you in any of the 15 Midwest and Rocky Mountain states. Or write **Standard Oil Company (Indiana), 910 S. Michigan Ave., Chicago 80, Illinois.**

Quick facts about

STANODIESEL OIL M

- Keeps crankcase, pistons, cylinder walls clean.
- Combats deposit and wear problems imposed by use of economy fuels.
- Maintains film on difficult to lubricate parts.
- Eliminates fuel injector and pump sticking caused by deposits on injector barrel and plunger where fuel and lube oil mix.

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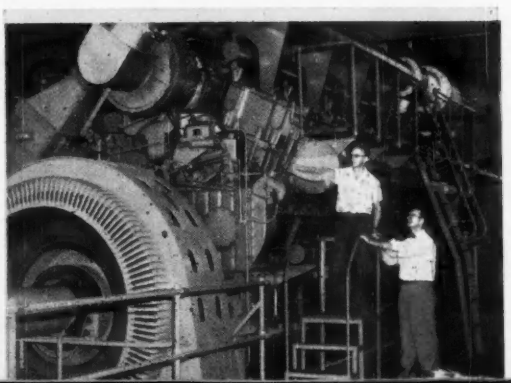

Running smoothly. Gene Williamson, power plant superintendent, and Standard Oil's Bob Wenger (right) check over new Worthington Dual-Fuel engine. Good lubrication technical service is one of the reasons Williamson decided upon STANODIESEL Oil M when engine was installed. Bob Wenger is well qualified by both experience and training to provide such technical service. He has been doing this work for nine years. In addition, he has an engineering degree from Iowa State and has completed the Standard Oil Sales Engineering School.